EEI BULLETIN

• MAY 1959 •

Inventorying Customer Contacts

E. O. George

$100,000 Light for Living Medallion Home Contest

Report on Project for Field Testing Extra-High-Voltage Cables

L. G. Smith and G. P. Adams

EEI-AGA Accounting Conference

PUBLISHED BY EDISON ELECTRIC INSTITUTE

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)

January 1958-1959

SOURCE AND DISPOSAL OF ENERGY—MONTH OF JANUARY

	1959	1958	%
NET GENERATION* (Kwhrs in Thousands)			
By Fuel Burning Plants	48,651,553	42,838,468	+13.6
By Water Power Plants	11,291,594	12,524,824	− 9.9
Total Generation	**59,943,147**	**55,363,292**	**+ 8.3**
ADD—Net Imports Over International Boundaries	277,595	276,172	+ 0.5
Less—Company Use	183,464	166,301	+10.3
Less—Energy Used by Producer	1,879,902	1,250,455	+50.3
Net Energy for Distribution	**58,157,376**	**54,222,708**	**+ 7.3**
Lost and Unaccounted for	5,696,227	5,789,734	− 1.6
Sales to Ultimate Customers	**52,461,149**	**48,432,974**	**+ 8.3**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of January 31st			
Residential or Domestic	49,294,479	46,859,765	**
Rural (Distinct Rural Rates)	.....	1,650,108	**
Commercial or Industrial:			
Small Light and Power	6,503,663	6,216,178	**
Large Light and Power	317,022	308,888	+ 2.6
Other Customers	189,427	182,720	+ 3.7
Total Ultimate Customers	**56,304,591**	**55,217,659**	**+ 2.0**
KILOWATTHOUR SALES—During Month of January (Kwhrs in Thousands)			
Residential or Domestic	16,967,286	14,919,212	**
Rural (Distinct Rural Rates)	.....	775,895	**
Commercial or Industrial:			
Small Light and Power	9,072,946	8,118,718	**
Large Light and Power	24,294,619	22,627,766	+ 7.4
Street and Highway Lighting	563,148	529,456	+ 6.4
Other Public Authorities	1,149,102	1,036,770	+10.8
Railroads and Railways	355,032	376,213	− 5.6
Interdepartmental	59,016	48,944	+20.6
Total to Ultimate Customers	**52,461,149**	**48,432,974**	**+ 8.3**
Revenue from Ultimate Customers (Thousands)	**$885,725**	**$824,465**	**+ 7.4**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—for 12 months ended January 31, 1959			
Kilowatthours per Customer	3,395	3,197	**
Average Annual Bill	$85.89	$81.52	**
Revenue per Kilowatthour	2.53¢	2.55¢	**

* By courtesy of the Federal Power Commission.

** 1959 not comparable to 1958 due to Rural being in process of reclassification. Rural data now allocated principally between Residential and Commercial.

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The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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CONVENTIONS AND MEETINGS

1959

MAY

18-19 EEI Sales Personnel and Training Committee, EEI Headquarters, New York City, N. Y.

18-19 NELPA Business Development Section, Advertising & Public Relations Committee, & Rate Research Committee, Multnomah Hotel, Portland, Ore.

19 Pacific Coast Electrical Association Board of Directors Meeting, San Francisco, Calif.

20-22 Pacific Coast Electrical Association Annual Convention, Fairmont Hotel, San Francisco, Calif.

25-26 EEI Electrical System & Equipment Committee, Roosevelt Hotel, Pittsburgh, Pa.

25-28 ASME Design Engineering Conference & Design Engineering Show, Convention Hall, Philadelphia, Pa.

26-27 EEI Investors Relations Committee Meeting, Conrad Hilton Hotel, Chicago, Ill.

28 EEI Commercial Lighting Committee, EEI Headquarters, New York City, N. Y.

28 EEI Residential Wiring Promotion Committee, EEI Headquarters, New York City, N. Y.

JUNE

4- 6 NELPA Accounting & Business Practice Section, Finlen Hotel, Butte, Mont.

7- 9 Wisconsin Utilities Association Accounting Section Convention, Lake Lawn Lodge, Delavan, Wis.

10 PIP Steering Committee, Pierre Hotel, New York, N. Y.

11-12 AGA Managing Committee, The Homestead, Hot Springs, Va.

14-18 ASME Semi-Annual Meeting, The Chase, Park Plaza Hotels, St. Louis, Mo.

22-23 Michigan Electric Association Annual Meeting, Mackinac Island, Michigan.

22-26 Air Pollution Control Association Annual Meeting, Hotel Statler, Los Angeles, Calif.

24-26 Canadian Electrical Association Annual Convention, Manoir Richelieu, Murray Bay, Que.

25-26 EEI-AGA Depreciation Accounting Committees, Chatham Bars Inn, Chatham, Mass.

JULY

6-8 EEI Accident Prevention Committee, Biltmore Hotel, Los Angeles, Calif.

SEPTEMBER

7-10 Illuminating Engineering Society National Technical Conference, Fairmont & Mark Hopkins Hotels, San Francisco, Calif.

11-12 The Maryland Utilities Association Annual Fall Conference, The Cavalier, Virginia Beach, Va.

14-15 EEI-AGA 1959-1960 Accounting Division & Section Organization Meetings, Hotel Cleveland, Cleveland, Ohio

14-16 EEI Meter and Service Committee, Hotel Wentworth, Portsmouth, N. H.

16-17 PIP Workshop Conference, Warwick Hotel, Philadelphia, Pa.

SEPTEMBER

17-18 EEI Industrial Power & Heating Group, Treadway Inn, Niagara Falls, N. Y.

17-19 Public Utilities Association of the Virginias 41st Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

21-23 EEI Industrial Relations Committee Twelfth Annual Round Table Conference, Drake Hotel, Chicago, Ill.

24-25 Missouri Valley Electric Association Accounting Conference, President Hotel, Kansas City, Mo.

28-30 NELPA 52nd Annual Meeting, Hotel Vancouver, Vancouver, B. C.

30-
Oct. 1 PEA Annual Meeting, Philadelphia, Pa.

OCTOBER

1- 2 EEI Transmission and Distribution Committee, Rice Hotel, Houston, Tex.

5- 6 EEI Electrical System & Equipment Committee, Hotel Muehlbach, Kansas City, Mo.

5- 7 AGA Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

7- 9 Missouri Valley Electric Association Sales, Rural & Home Service Conference, President Hotel, Kansas City, Mo.

7- 9 Indiana Electric Association Annual Convention, French Lick-Sheraton Hotel, French Lick, Ind.

12-14 EEI Prime Movers Committee, Barringer Hotel, Charlotte, N. C.

12-15 NARUC Convention, Bellevue-Stratford Hotel, Philadelphia, Pa.

14-16 Wisconsin Utilities Association Operating & Sales Convention, Schroeder Hotel, Milwaukee, Wis.

15-16 Southeastern Electric Exchange Engineering & Operation Section, Fall Meeting, Biltmore Hotel, Atlanta, Ga.

20-22 EEI Area Development Committee, Westward Ho Hotel, Phoenix, Ariz.

22-23 EEI Statistical Committee, The Homestead, Hot Springs, Va.

22-23 Southeastern Electric Exchange Accounting Conference, Shoreham Hotel, Washington, D. C.

25-29 Rocky Mountain Electrical League 56th Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo.

NOVEMBER

4- 6 New Jersey Utilities Association Annual Meeting, Seaview Country Club, Absecon, N. J.

5- 6 Pacific Coast Electrical Association, Hawaiian Conference, Matson House, Honolulu, Hawaii.

12-13 Electric Council of New England Third Annual Conference, Hotel Somerset, Boston, Mass.

16-18 Southeastern Electrical Exchange Sales Section, Roosevelt Hotel, New Orleans, La.

19-20 AGA Managing Committee Meeting, Westward Ho Hotel, Phoenix, Ariz.

Inventorying Customer Contacts

By E. O. George

Vice President, The Detroit Edison Co.

In This Article, Written for the* BULLETIN, *Mr. George Says, "We Want Our Customers to Think Well of Us and We Intend to Go 'All Out' in Keeping Ourselves Informed of Their Opinion of Us."

As public utilities we need to be continually on the alert—making certain we are maintaining whatever good customer relations we enjoy while at the same time seeking new ways to improve these relationships. Even long-established and seemingly popular policies and practices can slowly cause customer dissatisfaction, without our being aware of it until it becomes widespread, if we do not provide adequate means for measuring customer opinion.

At Detroit Edison we have a three-point plan for keeping ourselves aware of customer reaction to our policies and practices, and for doing something about these reactions when they are not as we would like them.

First, we have a procedure for recording and tabulating all customer complaints and all evidences of customer irritation, even those which appear to be mild in nature. Many other comments and inquiries are also recorded. We call it our "Customer Contact Inventory." The procedure in its present form is fairly new for us, having been established last October.

Customer Opinion Surveys

Second, it has been our long-standing custom to conduct customer opinion surveys with our own personnel at intervals of approximately two years. These surveys are usually intended to obtain opinions about a specific subject of current interest but our questions are always designed to reflect opinions about other items or our service in general. Also, at less frequent intervals, we employ outside research organizations to obtain customer opinions for us, to substantiate or verify our own information as well as provide an outside evaluation not affected by our own beliefs and biases. Our Customer Contact Inventory and these opinion surveys supplement each other. Neither method by itself gives us all the information we want.

Third, we have had a permanent Customer Policy Committee for several years, composed of eight men of department-head and higher levels, together with a secretary, representing several departments of the company. The following excerpt is taken from our Table of Organization and describes its purpose:

Customer Policy Committee

This Committee maintains a continuing review of policies and practices affecting customer relations and makes recommendations regarding them to the Vice President, Sales; General Accountant; and Vice President and Controller.

J. DOUGLAS ELLIOTT, Co-Chairman
HOWARD R. STEVENSON, Co-Chairman

JOHN W. DRUMMOND
CHARLES J. GHESQUIERE
RALPH B. GRIERSON
GEORGE L. LAHODNY
THOMAS J. PETERSON
EVERETT E. ROLL

CHARLES W. PETERS, Secretary

Information obtained from our Customer Contact Inventory and from the customer opinion surveys is of immeasurable help to this Committee. The Committee, through the use of subcommittees, conducts studies of all customer relations policies and practices which may appear to warrant consideration.

Our Advertising Division is part of our Sales Department, so it is well represented on the Customer Policy Committee by the three members from the Sales Department. The Advertising Division's main role in the customer relations area is to design and prepare various information pieces for distribution to customers. Over a period of years we have used quite a variety of such pieces. The need for such pieces, or the revision of existing ones, is often suggested by the Customer Contact Inventory.

Our regular advertising program does, of course, attempt to sell customers on the value of electricity. It can't help but do this if it is to succeed in combatting our competition. We avoid having our advertising assert that electricity is "cheap" or necessarily low-cost. Rather, we like to tell about its many advantages and the other values it includes at no additional cost such as lamp exchanges, appliance repairs, trouble service, etc. The advertising perhaps has a desirable effect on our complaint problem, particularly bill complaints, although we

Bulletin board posters keep customer contact personnel reminded of the importance of reporting all complaints.

do not consider this to be the main objective of our advertising program.

The reporting of all customer complaints is by no means new for our customer contact personnel. We first instituted a formal plan for the review of customer inquiries, comments and complaints in 1932. Sometimes the review was centralized; at other times the review was made by the respective district managers. Changes in the plan occurred as the need or desire for the information seemed to vary. We are convinced that the need for the review and the resultant information never diminishes, if we are to do the best possible job of maintaining and improving our customer relations.

It became apparent to us early in 1958 that our plan ought be broadened in keeping with our customer growth and the ever-increasing need for very close attention to good customer relations. As the number of our customers grows, our relationships with them tend to become less personal, and it becomes increasingly difficult to sense or anticipate trouble areas. It is becoming more and more important to have evidence for evaluating the trends in progress, and to have it as early as possible.

We decided we needed to do more than just count certain kinds of orders issued to correct errors and remedy other bad situations. It seemed to us that we needed to devote more effort to analyzing inquiries and complaints, and to determining the reasons and causes behind them. More specifically, we decided we should attempt to learn what we do, or fail to do, that irritates or even mildly displeases our customers. This sounds fundamental, but when one stops to think about it, it quickly becomes apparent that this information is necessary to anyone wishing to improve his customer relations position. It isn't safe to become complacent and assume that good relations with customers are being maintained or enhanced, with no tangible evidence to support the assumption.

So we developed our "Customer Contact Inventory," a procedure for the continuous inventorying of customer comments and inquiries. We now ask all our personnel who contact customers, whether by telephone, mail or in person, both in company offices and at customers' premises, to report all customer complaints, plus many other comments and inquiries, to a central staff group. Our customer contacts number something like five million per year, excluding those made by meter readers. There probably is no better source of customer opinion than that which is heard and observed, unsolicited, by our customer contact personnel during the course of these five million contacts.

The reporting of the comments and inquiries does not relieve the local organizations under the direction of our division and district managers of their responsibility for maintaining good customer relations. These groups are still responsible for taking whatever action is necessary and appropriate to satisfy customers in individual situations. The reports to the central staff group are submitted after the complaints and inquiries are settled with the individual customers who made them. The staff group concerns itself with classifying the situations, counting them and then analyzing them to determine basic causes.

To obtain written reports of all complaints and certain inquiries from all customer contact personnel is not

(*Continued on page* 202)

This is another of the posters prepared by The Detroit Edison Co. to remind customer contact personnel to report immediately all complaints made by customers.

Here's What the Customers Are Saying

Prepared by Customer Relations Services,
The Detroit Edison Co.

"I thank you for not cutting my lights off. You people have a heart." Customer owed only $3.66. (Washington Office)

Customer frantically called from Florida at midnight to cancel a Disconnect Order. She had mailed a letter to us from Florida, requesting that her meter and water heater service be disconnected. We already had decided to hold up the disconnection of the metered service because we knew it controlled a furnace. (Farmington Office)

"My home was without electricity due to a fire which destroyed my garage. This was at 6:00 a.m. Your service was very fast and efficient. Within 45 minutes electric service was restored. Thanks again." (Detroit C & A)

"At a recent Chrysler stockholder's meeting, I brought to their attention the fine courteous service everyone receives from Detroit Edison people." (Grand River Office)

Reported that a light bulb exploded in light fixture. Tiny fragments struck her in the back. Said she was not injured. Light bulb and report sent to Legal Department. (Lexington Office)

"Thank you so much for sending a second notice. I've been looking everywhere for the original notice which I misplaced." Refers to Reminder Notice which is sent approximately 15 days after due date. (Utica Office)

"You told me to figure 3¢ for each two gallons of oil for electricity. I did this and it really comes out close." (Birmingham Office)

Wanted to know why, after having the Lampeteria, we went back to "this nonsense." Referring to having to present a bill on exchanging lamps. (Ann Arbor Office)

"Why does the Edison Co. want our money so quick? They have plenty of money. They paid their taxes in advance as soon as the State requested it." (Wayne Office)

"Our new electric water heater is just wonderful. I am so glad that man came to the house. I just wish he would have come two years ago. I haven't used my teakettle since we got the heater. We feel it is really a saving." (Port Huron Office)

"I really appreciate your granting me an extension. I've been in business for over 13 years, and it's just recently we've had financial troubles. If everyone will bear with us for a while, we can work back out again." (Wayne Office)

"I have a lot of respect and faith in the Detroit Edison Company. I wish I could afford to buy some stock in it." (Lapeer Office)

"I tried to get you to repair my electric blanket last month and you told me to take it back where I purchased it. I see that the other clerk just accepted that other lady's blanket. How come you repair for some people and not others?" Other customer had purchased her blanket from us. (Trenton Office)

"The service I received on my range and calcinator was quicker than if I had paid for the service. Now I would like an engineer to come out and see what is necessary for me to convert to electric heat. We need some competition for gas and oil which are always going up in price." (Plymouth Office)

"What is the name of that little guy you use in your advertising?" (Port Huron Office)

Church in Croswell figures they saved $300 in year's fuel bills since they can heat any part of the church without wasting heat on unused rooms. "I have a 3000-watt element in the study of my church and it's wonderful. Sure does the job in a hurry." (Sandusky Office)

TABLE I—SUMMARY OF COMPLAINTS, THE DETROIT EDISON CO., FOURTH QUARTER, 1958

	Totals	*Original Complaints*	*Second Complaints*	*Third Complaints*
Service—Includes all free services, Customer Service Activities, Customer Offices, Agencies, CBR activities, telephone service	1,158	1,084	31	43
Meter Reading, Billing, Accounting, Collecting, Credit	1,536	1,534	1	1
High Bills	11,407	11,368	34	5
Charges for Electricity—Includes Rate Application, Discount Policy	30	30	0	0
Appliance Sales—Includes Price, Installation, Delivery, Condition	105	104	0	1
Company System & Equipment—Includes our equipment such as lines, service drops, meters	98	74	8	16
Personnel—Includes attitude, conduct, training	57	56	1	0
General—Not otherwise classified	27	26	1	0
TOTALS	14,418	14,276	76	66

without its complications. We found it necessary to carefully define our overall objectives and to establish detailed procedures for reporting individual comments and inquiries. The preparation of written reports, in addition to service orders, duplicate bills and various other forms is time consuming for the customer contact representative. Likewise, it takes time to tabulate and analyze. Manpower is at a premium and we have, in effect, increased our transaction time with customers in order to get the desired information.

How does it work and what are our experiences with it since Oct. 1, when we placed it in operation? First of all, the complaints and unfavorable comments are classified in the eight categories shown below. We have grouped them according to functions and not departments because this seemed most logical and objective.

- Service—Includes all free services such as lamp and cord exchanges and appliance repairs, customer service activities, customer offices, bill payment agencies, field activities and investigations, and the handling of telephone calls.
- Meter Reading, Billing, Accounting, Credit and Collection.
- High Bill Inquiries and Complaints.
- Charges for Electricity—Includes rate applications, prompt payment discount policies, etc.
- Appliance Sales—Includes prices, installation, delivery and condition of appliances.
- Company System and Equipment—Includes equipment such as lines, service drops and meters.
- Personnel—Includes attitudes, conduct and training.
- General—Not otherwise classified.

Each of the eight major categories is broken down into several sub-categories, which, in turn, are further defined with the more frequent reasons and causes spelled out. For example, the category "Meter Reading, Billing, Accounting, Credit and Collection" contains the following sub-categories and there are several pre-established "complaint subjects" under each, as follows:

Meter reading
Record keeping
Bill preparation and computation
Bill forms
Bill delivery
Credit
Collection

Monthly and quarterly reports are prepared. These are mainly quantitative in character, but include a few simple graphs to indicate trends, as well as a few paragraphs of verbal comment calling attention to interesting and notable items, with the reasons if they are known. Copies of the reports are given to all members of our company's Management Council, all members of the Customer Policy Committee, many department heads and all supervisory personnel concerned with customer contact activities. Portions of the monthly reports are further broken down into greater detail for use by the individual district managers and other division heads.

At intervals of approximately 10 days we publish a one-page list of selected comments and complaints—ones which are particularly interesting, perhaps of special current interest, or just unusual. We call this sheet "Here's What the Customers Are Saying" and it has the same distribution as the monthly and quarterly reports mentioned above.

Specific Departments Notified

Copies of individual complaint reports are referred to specific department heads in those cases when the activities or facilities of other departments are concerned. For example, a comment regarding the work done by a tree trimming crew is referred to the head of our Overhead Lines Department, those about advertising to our Director of Advertising, etc.

Observations of the Inventory to date have indicated several rather significant things:

- We are now able to recognize problem areas or situations and institute appropriate corrective measures more quickly.
- We find it easier to alert other departments not specifically performing customer contact responsibilities of existing conditions which may be the sources of problem situations. We have already made some advantageous procedural improvements in meter reading, customer billing and accounting because of situations revealed by customer contacts.
- We are not satisfied that we are tabulating the complaints rapidly enough. With this thought in mind, we have organized a special study group to explore new ways of sorting and coding, possibly through the use of mark-sensed tabulating cards. We hope to make

(*Continued on page* 204)

TABLE II—CAUSES FOR COMPLAINTS, THE DETROIT EDISON COMPANY, FOURTH QUARTER, 1958

Cause for Complaints	*Service*	*Meter Reading, Billing, Etc.*	*High Bills*	*Charges for Electricity*	*Appliance Sales*	*Company System and Equipment*	*Personnel*	*General*	*Total*
Location or Position	—	—	—	—	—	2	—	—	2
Slack Wires	—	—	—	—	—	2	—	—	2
Burned Out	—	—	—	—	—	10	—	—	10
Turned On in Error	8	17	4	—	—	—	—	—	29
Transferred in Error	13	7	—	—	—	—	—	—	21
Disconnect in Error	31	8	—	—	—	—	—	—	39
Permits	9	—	—	—	—	—	—	—	9
Inspection	4	—	—	—	1	1	—	—	6
Policy	143	128	4	17	46	5	—	9	352
App. Lost or Apparently Lost	1	—	—	—	—	—	—	—	1
Telephones Busy	5	—	—	—	—	—	—	—	5
Delays—Obtain Info. from Other Departments	1	2	—	—	—	—	—	—	3
Skip Reading	—	168	—	—	—	—	—	—	168
Rdg. Arrgmts. Not Obs.	—	2	—	—	—	—	—	—	2
Wrong Amount Posted	—	—	1	—	—	—	—	—	1
Paymt. Posted—Wrong Acct.	—	8	—	—	—	—	—	—	8
Paymt. Not Credited	—	8	—	—	—	—	—	—	8
Paymt. CR After Stmt. Prep.	—	125	1	—	—	—	—	—	126
Off. Failure to Notify Coll.	—	2	—	—	—	—	—	—	2
Error in Name or Add. or c/o Address	—	29	—	—	—	—	—	—	29
Correction Ord. Delayed or Lost	—	5	—	—	—	—	—	—	5
Errors in Acct. Records	2	85	10	—	—	—	—	—	97
No Ord. or Disc. Given	2	29	—	—	—	—	—	—	31
Ord. or Disc. Lost or Delayed	—	132	—	—	—	—	—	—	132
Delayed Billing	—	27	—	—	—	—	—	—	27
Revised Bill	—	5	—	—	—	—	—	—	5
Duplicate Billing	—	2	—	—	—	—	—	—	2
C. & A. Record Not Correct	—	13	—	—	—	—	—	—	13
Agents Late Remittance	—	18	—	—	—	—	—	—	18
Service Dates Overlapping	—	—	1	—	—	—	—	—	1
Both Ends Bill to Customer	—	2	—	—	—	—	—	—	2
Increase in Family	—	—	167	—	—	—	—	—	167
Faulty Appliance	2	1	224	—	—	—	—	—	227
Improper Use of Equipment	—	—	104	—	—	—	—	—	104
Underest. Cost of Operation	—	—	207	—	—	—	—	—	207
Irregular Bill	—	2	321	—	—	—	—	—	323
Use or Application	2	3	234	—	—	—	—	—	239
Improper Rate	—	—	15	—	—	—	—	—	15
Parts Not at Cent. Parts Stockroom	1	—	—	—	—	—	—	—	1
Parts Not at Field Location	3	—	—	—	—	—	—	—	3
Reading Estimated	—	—	681	—	—	—	—	—	681
Load Added	—	—	476	—	—	—	—	—	476
Incorrect Reading	—	3	1136	—	—	—	—	—	1139
Ground	—	—	33	—	—	—	—	—	33
Switched Meters	—	13	22	—	—	—	—	—	35
Seasonal Use	—	—	819	—	—	1	—	—	820
Faulty Meter	—	—	9	—	—	—	—	—	9
Incorrect Rate Application	—	1	5	—	—	—	—	—	6
Rate Application Policy	—	1	1	1	—	—	—	—	3
Delay in Rate Change	—	3	—	—	—	—	—	—	3
Post Office Delay	—	50	—	—	—	—	—	—	50
Bill Overdue	21	1	—	—	—	—	—	—	22
Meter Inside—Unable to Read	—	51	1	—	—	—	—	—	52
Switched Bill Head	—	1	—	—	—	—	—	—	1
Inactive Meter Policy	2	52	5	—	—	—	—	—	59
Delay in Disconnecting Service	4	1	1	—	—	—	—	—	6
Customer Misunderstanding	—	4	—	—	—	—	—	—	4
Not Recorded	904	527	6925	12	58	77	56	18	8577
TOTALS	1158	1536	11,407	30	105	98	57	27	14,418

greater use of mechanical equipment for this work as time goes on.

• It isn't easy to achieve 100 percent reporting of situations when a separate piece of paper needs to be filled in, not to accomplish any specific action for the particular customer involved, but only to report a case of irritation. Sometimes the situations may reflect on an individual or another work group, and this creates a natural hesitancy to report it. We continue to work on this part of the problem and are gradually improving the volume of reporting. A series of bulletin board posters is one means we are now using to help keep our customer contact personnel reminded of the importance of reporting all complaints.

In our early days we established many good-will building policies and offered extra advisory services without charge. These things played a big part in creating a good customer relations reputation for us. Naturally, we have continued those which are most beneficial to our customers in spite of rising costs. We feel our company's reputation was built on service and that we have an obligation to maintain it. Our lamp exchange and appliance repair policies, for example, provide thousands of very desirable face-to-face contacts annually and we endeavor to make the most of these opportunities to create a favorable impression. But unless we remain alert, these same policies and services can become the source of customer dissatisfaction. The new Customer Contact Inventory provides a way to measure the effectiveness of these costly services, rather than leaving us to perhaps assume we are doing a good job based on the number of transactions handled.

The subject of customer relations is receiving concentrated attention in our company. Our Customer Contact Inventory, supported by customer opinion surveys, gives us the information we need. Analysis of individual complaints points out areas of weakness—be they policies, practices, training, organization, facilities, personnel or other things. Our Customer Policy Committee studies the information and recommends improvement. We want our customers to think well of us and we intend to go "all out" in keeping ourselves informed of their opinion of us.

EEI, SBA Count Small Business Manufacturing Facilities

TWO committees of the Edison Electric Institute have been cooperating with the Small Business Administration in the efforts of the government agency to develop an inventory of small business manufacturing facilities of the country.

Two Committees

The General Power and Heating Committee with J. H. Ahrens as Chairman, and the Area Development Committee with S. F. McGowan as Chairman, have met with the Small Business Administration officials within the past year to organize cooperatively a plan of developing an inventory of production capacities of this country's 308,600 small manufacturers. In addition to the two committees of EEI, A. C. Spurr, former president of the Monongahela Power Co., has been serving SBA as a consultant in connection with this undertaking.

An outgrowth of the cooperative program was a pilot plan whereby listings of industrial and commercial customers can be obtained from various EEI members. The plan has proved successful and will be conducted throughout the country in the near future.

In some instances, local power companies have already prepared brochures or listings of industrial power users which are, in effect, an inventory of manufacturing firms served by such companies. Other cases showed that listings have been prepared from the account records of industrial and commercial customers of local power groups.

The facilities inventory will provide a source list of small firms that might have resources and capabilities to take on government research and development contracts. It will also provide a basis for assisting local small businesses to obtain other government prime and subcontracts from both military and civilian agencies. In addition, the inventory will aid the SBA in locating potential suppliers of defense and civilian items purchased by the government. Of equal importance, it will provide a source for mobilization and defense purposes.

In cooperation with the EEI, the SBA's field office representative will call on various EEI members and work directly with them on an inventory listing. Members who have already cooperated with SBA in the pilot study also will be contacted by SBA representatives to discuss ways and means of conducting the inventory program.

EEI Cooperation Helps

Under the Small Business Act of 1958, the Agency is authorized to ". . . make a complete inventory of all productive facilities of small business concerns. . . ." The cooperation of the Edison Electric Institute is making it possible to implement more fully this provision of the Small Business Act.

$100,000 Light for Living Medallion Home Contest

FOUR Light for Living Medallion homes based on the winning designs in EEI's recent student-architect contest will be awarded as grand prizes in a new $100,000 consumers' contest announced by the Institute.

The architects' contest, which awarded $18,000 in cash to the winning students and their colleges, was designed to stimulate among architects of tomorrow interest in design for better lighting to help consumers see and live better electrically; to provide these students with incentives for creation and development of new ideas in designing with light; and to help acquaint them with the latest advances in lighting, wiring and other electrical features available today.

The student-architect contest, according to R. J. Miller, Chairman of the EEI Residential Lighting Promotion Committee and Sales Promotion Manager of The Cleveland Electric Illuminating Co., provides the foundation for the National Consumers Contest.

Architectural plans of the prize-winning homes based on the student designs have been prepared by Ketchum and Sharp, New York architectural firm, for distribution to member electric companies for builders interested in all-electric Medallion homes. These plans will be used by local builders to build Light for Living Medallion homes. The first of these model homes is expected to be open to the public about Sept. 15 of this year in cooperation with National Home Week, Parade of Homes and the launching of the $100,000 contest in *Life* magazine. All homes were designed to accommodate a family of four and to be built for less than $20,000, exclusive of lot. and including electrical equipment and major appliances.

Henry Wright, AIA, New York architectural consultant who was chairman of the committee judging the students' designs, said the Light for Living competition was planned to establish among a new generation of designers a real awareness of lighting as one of the structural arts. Other judges were: Raphael Soriano, AIA; Tiburon, Calif.; Wilbur Riddle, AIA, Cleveland, Ohio; and Miss Stella Fetzer, Cincinnati, Ohio.

First-prize winners in the contest were: P. Connor Lee, Hamilton, N. C., student at North Carolina State College, Southeast Region Home; John G. Bulcken, New Freedom, Pa., Pennsylvania State University, Northeast Region Home; William C. McGee, Jr., Concord, N. C., North Carolina State College, Northwest Region Home; and James F. Kluttz, Concord, N. C., also of N. C. State. Each top winner received $2,000, and his school received $500. There were 17 honorable mention awards.

$100,000 Consumer's Contest

The $100,000 Consumers' Contest will be announced in a two-page *Life* magazine advertisement on Sept. 14 and full-page follow-up ads will appear in the Oct. 10 and Nov. 7 *Saturday Evening Post* and the Oct. 13 and Nov. 10 *Look*. In addition to the four grand prize Light for Living Medallian homes—one in each of four sections of the country—the contest will offer more than 1000 other prizes.

The contest entry blank will be printed on the inside of the back cover of a 16-page lighting booklet which will be supplied to utility companies by EEI. A series of "true-or-false" questions which must be answered by the contestant requires that he read through the booklet for clues to the correct answers. Indication as to just where the clues can be found are listed under each question. The page number is listed. The booklet contains information on how to live better electrically in a Light for Living home, with pages devoted to "Lighting for Atmosphere and Accent," "Light for Living in the Kitchen," "Lighting in the Living and Dining Areas," "Light for Living Lamps," "Light Control," "Bathroom Lighting," "Outdoor Light for Living" and "Light and Safety and Convenience."

Half Million Entries Expected

The contest, which is expected to draw 300,000 to 500,000 entries, is designed to educate the contestant to proper lighting needs in the home. When all questions have been answered, the entrant writes a 20-word statement telling why he would like to live in a Light for Living Medallion home.

Contest booklets will be available at local electric companies, lamp and fixtures stores and model homes beginning in September during National Home Week.

Life, *Look* and *Saturday Evening Post* were selected for the consumer contest advertising because each magazine has a builders' merchandising program. Mailings giving details of the contest will be made by the magazines to its lists of builders. The American Home Lighting Institute also will cooperate through mailings to its manufacturer members who plan to tie in retail outlets with the consumer contest.

EEI will make available to member companies a promotional package which can be used locally to tie in with the national promotion.

The student-architect contest launched the $500,000 1959 national lighting program of EEI, as a part of the National Electric Living Program.

Considerable space was given to the winners and runner-up students in their area newspapers.

As an example of the ingenuity that went into the design, Mr. Bulcken said it was the electric features which enabled him to develop more living space within the size limitations. Pointing out that there are many new ideas in electrical equipment which are going to change vastly construction ideas, he noted that his prize-winning home is heated by wires buried in the plaster, freeing every inch of the interior space for other uses.

Progress Report on the AEIC-EEI Project for Field Testing Extra-High-Voltage Cables

By L. G. Smith
and
G. P. Adams

EEI Representatives of the Steering Committee for the Project

WITH construction of the Cornell Test Station scheduled to start in the near future, this appears to be an appropriate time to present a report to the EEI T&D Committee on the progress of the Extra-High-Voltage Cable Testing Project. It supplements reports presented before this Committee in May, 1955, May, 1956 and October, 1957.

Financing

The cable and accessory manufacturers were assured by the electric utilities that a field testing program would be carried out if the manufacturers would develop suitable 345-kv cable systems. The money to finance such a field program has been assured. The AEIC and EEI have underwritten $200,000 of the required $500,000, and the individual electric utilities which were solicited for money have responded with pledges for the remainder.

Cable and Accessories

The manufacturers, on their part, have vigorously engaged in basic research and in improvements in manufacturing techniques to produce cables and accessories capable of operating at 345 kv and carrying loads of 500 mva or more. It is not feasible to estimate the magnitude of the expenditures and commitments which have been made and are being undertaken by the four cable and two accessory manufacturers to fulfill their part of the agreement.

The types of cables to be offered to meet Steering Committee requirements are now known. General Cable Corp. and the Okonite Co. will furnish pipe-type cables. Phelps Dodge Copper Products Corp. will offer high-pressure, oil-filled cable with an aluminum sheath. A low-pressure, oil-filled cable with a lead sheath will be offered by Anaconda Wire and Cable Co. Both of these latter cables will be tested at Cornell in a duct line although the manufacturers recommend direct burial to obtain higher permissible loading for commercial installations when local conditions are favorable. Anaconda also expects to offer an experimental length of cable with synthetic resin insulation as a new approach to the design of high-voltage cables.

Presented before the EEI Transmission and Distribution Committee Meeting, Washington, D. C., May 7, 1959.

Field test samples will contain joints and terminals representative of a commercial installation of the respective cable system. Potheads are being developed by G&W Electric Specialty Co., Ohio Brass Co. and Anaconda.

Cornell has been selected as the university to conduct the field testing program, and negotiations are now in progress with Cornell to complete the contracts. It is intended that the entire test program be under the supervision and direction of Cornell. It will be conducted by Cornell people at the professorial and post-graduate level. Cornell representatives are now participating actively with the Steering Committee in designing the station and planning the testing program.

Test Station

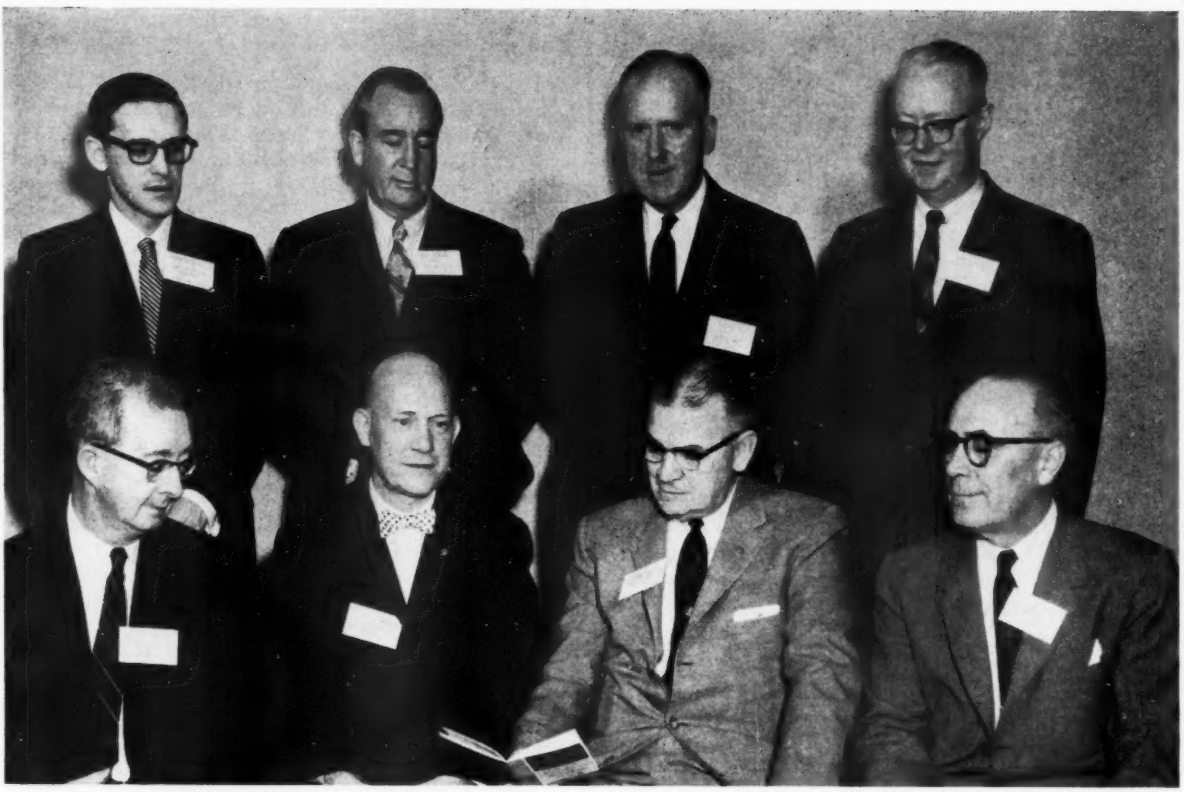
The site for the station at Cornell has been determined, and The Detroit Edison Co. is preparing the construction drawings for the installation of the cable systems at this site. The overall drawings appear close to being final. The layout has been designed to approximate commercial installations with some modifications to facilitate testing. Details of design associated with the individual cable systems are being developed with the particular manufacturer concerned.

For economy (and with no impairment of the validity of the test results) testing of each cable will be single rather than three-phase. The Philadelphia Electric Co. is designing the wood-pole test station on this basis. The overall design appears close to being final except as it may be affected by studies now in progress by task groups on power factor and temperature measurements and on switching surges. Detail design is progressing as specific information becomes available from the suppliers of station equipment.

Station Equipment

The field testing program could not be accomplished for the budgeted $500,000 without the loan of much of the major station equipment by interested manufacturers and utilities. Much of this has already been promised. There is a fine spirit of cooperation on the part of electrical equipment manufacturers and utilities in their offers to contribute to the test by the loan of major equipment. Included are Westinghouse with the "Tidd" trans-

(*Continued on page* 217)



EEI and AGA representatives confer at the general session of the National Conference of Electric and Gas Utility Accountants in Chicago, April 20. Standing, from left, are: Neal J. Dean of Booz, Allen and Hamilton; Edwin Vennard, Vice President and Managing Director of EEI; J. Theodore Wolfe, President of AGA; Gordon R. Corey, Vice President, Commonwealth Edison Co. Seated, from left are: Dr. Leland P. Bradford, National Training Laboratories; Beach J. McMillen, Chairman of EEI Accounting Division Executive Committee; J. Gordon Ross, Chairman of AGA Accounting Section, and Leslie A. Brandt, Vice President and Comptroller of The Peoples Gas Light and Coke Co.

EEI-AGA Accounting Conference

ELECTRONIC data processing equipment and systems, customer information programs and tax problems were among the major subjects discussed at the 1959 National Conference of Electric and Gas Utility Accountants in Chicago, April 20 to 22.

The three-day meeting was opened with a general session on April 20. Twelve hundred delegates from investor-owned electric and gas operating companies throughout the United States, were welcomed to Chicago by Gordon R. Corey, Vice President of Commonwealth Edison Co., and Leslie A. Brandt, Vice President and Comptroller of The Peoples Gas Light and Coke Co. Beach J. McMillen of The Cincinnati Gas & Electric Co., Chairman of the EEI Accounting Division Executive Committee, and J. Gordon Ross of Rochester Gas and Electric Corp., Chairman of the AGA Accounting Section, presided.

Greetings were offered by Edwin Vennard, Vice President and Managing Director of EEI, and J. Theodore Wolfe, AGA President and President of Baltimore Gas and Electric Co.

At the general session, Neal J. Dean, Technical Director of Electronic Data Processing of the management consultant firm of Booz, Allen and Hamilton, discussed obsolescence of electronic data processing equipment and systems. "Improving Managerial Performance" was the subject of an address by Dr. Leland P. Bradford, Director of National Training Laboratories.

Mr. Dean said that a consideration of obsolescence emphasizes the importance of determining the system requirements before selecting equipment. He added that these system requirements should be incorporated into a generalized system design specifying in terms of automatic operations what is required. Only then can equipment be evaluated in the light of these requirements to determine the best equipment for this application, he pointed out.

In specifying these system requirements, Mr. Dean said that many times policy decisions are required,

since the best way of performing an application utilizing EDP equipment may be significantly different from the way it is being performed today. This does not always mean that EDP must be compromised. Actually, he continued, it may be possible to perform the application in a way in which management would prefer, with electronic equipment, whereas it may never have been practical with manual or punched card systems.

Following this philosophy of designing the system first and then selecting the equipment has two important advantages, according to Mr. Dean.

"First," he said, "the system will determine the equipment and not vice versa; the all too prevalent procedure of selecting equipment and then distorting the system to fit that equipment will not take place. Secondly, it allows the selection of the latest and most advanced equipment by delaying, until the end, the selection of the actual equipment to be utilized."

Mr. Dean told the group that probably the most important conclusion which can be reached from our consideration of obsolescence is the importance of being realistic about the conversion period and the conversion cost in appraising the economics.

"Only after such a realistic analysis of these costs can management properly assess the risk of economic obsolescence," he said.

James Gibbons, Director of Management Advisory Services, Price Waterhouse & Co., in discussing the organization and maintenance of a data processing (tabulating) department, gave the following pointers to those concerned with data processing management:

Systems Efforts

- Plan all work and keep to schedules.
- Expend major efforts to gain major payouts.
- Report both progress and the reasons for lack of progress.
- In systems development give fundamental consideration to the conversion requirements.
- Plan for the consolidation of manual activities before work loads are shifted to machines.
- Provide for growth and flexibility.
- Make effective use of company communications for developing acceptance of new ideas.
- Provide educational opportunities and stimulate self-development.
- Take risks only when the rewards are commensurate.

Facilities Operations

- Plan all work and keep to schedules.
- Develop effective controls and use them.
- Know your costs and control them.
- Maintain a working environment which aids productivity.
- Know your people and get them to perform in accordance with their capabilities.
- Know what to do in any emergency before it occurs.
- Establish standards for operations and use them in estimating and scheduling.
- See that procedures and instructions are current and can be used and followed.

Robert R. Frei, Partner in the law firm of Sidley, Austin, Burgess & Smith, in his address on tax sheltered employee savings plans said:

"Tax qualified savings plans are a means by which employees can be encouraged to save and to invest in the future of American industry. These objectives are furthered by special tax provisions, which, however, require that participation in the plan extend beyond the stockholder, management, and highly paid groups. Savings plans are, at least in cases where the employer's stock is involved, subject to regulation under the Federal Securities Act of 1933 and some of the state securities laws. The so-called Federal Disclosure Act and comparable laws adopted by several states are also applicable and may be the forerunner of active regulation from still another direction."

Discussing employee motivation, J. P. Loughnane of Boston Edison Co., pointed out that there is no new formula for getting employees so thoroughly motivated that management can "put its feet up on its desk and take it easy." Motivation for good performance, he added, is an every day affair.

"One of the rewards of being in management is that our duties are broad enough and sufficiently varied to eliminate the possibility of boredom," he said. "If rotation is not practical, then provision should be made to allow for self-expression, competition and a chance to learn other functions. Programs designed to break up monotony, the deadly enemy of motivation, should be considered."

C. T. Loshing of The Cleveland Electric Illuminating Co., in his address on treatment of liberalized depreciation on economic studies, emphasized that although it has been shown that a reduction in total annual fixed charges is realized by employing liberalized depreciation, there are many economic determinants which must be evaluated.

"In economic problems of alternative choice where liberalized depreciation is employed," he said, "it is imperative that *all* related factors must be evaluated in a manner which is compatible with overall management objectives."

A Catalog of
EEI Publications
Is Available
Upon Request
to:
Edison Electric Institute
750 Third Ave.
New York 17, N. Y.

Customer booklets are used for many purposes. This one is designed to tell the customer of the services which are provided by the electric company.

ELECTRIC APPLIANCES
SIX POINTS TO CHECK FIRST
1. When an electric appliance does not work, the trouble is often in the CORD, not in the appliance. If the cord can be detached from the appliance, try another cord.
2. Try connecting the appliance to another electric outlet, as the first outlet may be out of order.
3. Make sure that the fuse supplying the circuit to which the appliance is connected has not "blown."
4. Make sure the plug is fitted tightly on the appliance, and that the cap of the cord fits firmly into the outlet.
5. On all automatic appliances be sure the switch or control dial is in the proper operating position.
6. Re-read the instructions furnished with the appliance and the suggestions on the following pages before calling a service man. This will often save you time and expense.

Much of what is printed in booklets is not immediately useful. Customers tend to forget what they have read or where they placed the booklet.

Customer Information— What, Why and How

By J. H. Purdy
Baltimore Gas and Electric Co.

A NEWS service dispatch from Washington, D. C., dated in December, 1958, dramatically highlights the major problems associated with all information pieces.

It seems, according to the dispatch, that Washington's air raid system was set off accidentally by telephone workers and the klaxons and sirens gave the dread news: get out of town.

A reporter who was on Washington's main street reported that "nobody did anything. Nobody ran or tried to get indoors. A few looked at the sky, but most just waited for the traffic light to change so they could get across the street."

In government departments, some workers headed for shelter; others went outside and milled about; most stayed at their desks. As far as can be determined, no one obeyed the alarm's command and got out of town.

The Civil Defense people naturally were upset because

An address before the National Conference of Electric and Gas Utility Accountants, Chicago, Ill., April 21, 1959.

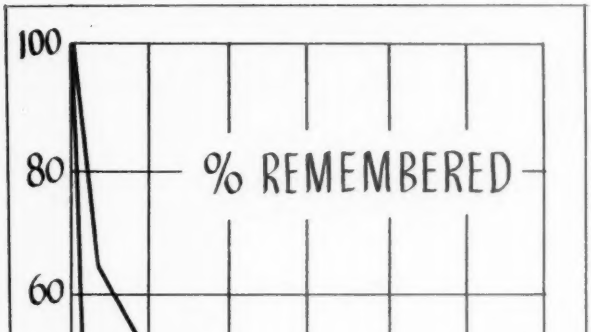


Figure 1

millions of cards had been put out explaining what the signals mean, and still no one remembered.

Millions of dollars spent, millions of cards distributed and still no one remembers! And "remembering" is just *one* of the three R's which determine the success of any information piece. The other two are "read" and "react." Printed material, designed to "educate" our customers—to get them to do something we want them to do—cannot accomplish its purpose unless those who receive it *read*, *remember* and *react*.

In order to prepare this report it has been necessary to rely on "experts" in the three R field—advertising men, psychologists, college professors and the like, especially those who have acquired specialized knowledge through research or experience. Many of the views, opinions and conclusions must be credited to the experts.

It may be helpful to take a broad look at utility information pieces. Customer booklets, pamphlets, leaflets, folders and other material have a wide variety of uses within our industries. Some companies use them extensively and for many purposes. Others use them sparingly and only for some special reason or occasion. Still others don't use them at all. One fact is certain: there is little uniformity in design, style or purpose.

Here are some typical ways of communicating customer information:

- A letter with no enclosures.
- A letter and one or more pamphlets.
- A letter and a booklet.
- A letter and a rate schedule.
- An envelope-type message folder.
- A pamphlet alone.
- A pamphlet, rate schedule and graph card.
- A packet of several pamphlets or booklets.
- A kit of several pamphlets, wiring plans, service policies, etc.

Here are some typical distribution plans:

To: New customers only.
Old customers only.
Both old and new customers.

By: Direct mail.
Delivery by sales representative.
Delivery by complaint representative.
Delivery by commercial or industrial representative.
Given at time application for service is made at office.
Given at time of other visits to office.
Display on "Take One" rack at various points.

Before any company starts to produce customer information material that company ought to decide explicitily: "What do we hope to accomplish? Do we have any real *reason* for issuing a publication?"

Some of the reasons which seem to appear most frequently in our review of customer information material are these:

- To welcome new customers.
- To influence customers' future actions (this is a tough one).
- To improve customer relations.
- To tell customers what services to expect.
- To explain how to use and care for appliances.
- An omnibus covering all the foregoing subjects.

When we are satisfied that we have a valid reason for getting information into our customers' hands, we face a second decision: "How should the information be distributed in order to get the best possible results?"

Before going any further, we ought to seek a little professional knowledge about human behavior. We ought to know such things as *how* and *why* people act under certain conditions—more specifically, how a utility customer will react upon receipt of information about the electric or gas business; what his first impulse will be; how much he will read, understand and retain; what the average person's ability is to recall information from memory—24 hours later—one week later—six months later. Let's look at a chart from the book, "How to Use Psychology for Better Advertising" by Dr. Melvin S. Hattwick. (Figure 1.)

Short Memories

Dr. Hattwick says that curve "A" is typical of many experiments based on memory for nonsense or non-associated syllables. The curve starts with an initial score of 100, meaning that all material presented was learned. After one day, only about 33 percent of the material is remembered. In six days, it is down to about 25 percent. Thereafter, it tends to level off. Some material is remembered for a considerable period, but the majority of it is forgotten *by the end of the first day.* If the persons learn meaningful rather than nonsense material, as indicated by the "B" curve, remembrance is better, but not too much better. Actually, one curve has the same pattern as the other and both are quite close together.

Dr. Harold Ernest Burtt, in his "Psychology of Advertising," brings out the importance of memory in the field of retail advertising. One device which is a powerful memory aid and a stimulus to action is the forming of an association in the mind of a person between a need and the product which will satisfy the need, or between a commodity and the name of the special brand being promoted.

Utility information booklets are not necessarily too unlike sales pamphlets or ads. There should be a need for the information which can be associated with our product in the mind of the customer. Hardly anyone would waste time and money on an information piece if he had the faintest idea there was no need for it. One big problem is to determine if a need exists, how strong the need is and the best way to satisfy it. For our purpose, we should know not only that a need exists, but if it exists now, occasionally, or all the time. This knowledge is helpful in controlling the kind of information we produce, when we produce it, and how often. Such information might also give us a lead as to how best to distribute the publication.

Welcome, Information Material

In most instances, welcome and information material is released with little attempt to determine the effect. Sometimes it seems to be taken for granted that public favor is won by a letter of welcome to new customers, an invitation to visit the plant or offices, or a booklet explaining company services or policies. This may or may not be true, for basically the big thing which influences our customers and wins new friends is a good product, which we all have, plus equally good service, which we don't always succeed in giving. Product and service go together in our business. Information pieces are no substitute for good performance.

Let's go back for a moment to Dr. Hattwick's learning curve. Curve "B" showed somewhat better remembrance traits than curve "A." This was because the material learned was meaningful. The individuals tested were able, by the psychological process of association, to call up other items logically related to the information they learned and thus aid their memory. Retail advertisers recognize this important factor in getting people to buy their product. Their principal objective is to get customers to remember their brand when customers want a certain commodity. Some advertisers have been most successful in this endeavor.

Good Service Is Important

This "association of ideas" can cause our customers to think well of us if a program of good service is tied in by our customers with our product. What is of primary importance *is* good service. Once we have achieved this, *then* we can begin to think about what information pieces will help to firmly establish this "association." We should then receive automatic credit; and many of our subscribers will talk in our favor—yes, even take up for us in an argument. If we can further improve our service efficiency, our "good name"—based on outstanding performance and aided by information to the customer —will grow.

It's more than a matter of money!
Since the beginning of September we have been removing from our poles all unauthorized signs and similar attachments which have been placed there in
VIOLATION OF THE LAW
Some of these signs may have cost their owners considerable money. And, of course, the job of removing them is an expensive one for us.
Regardless of cost, it is a job that must be done. Today over 50,000 of our poles are so cluttered with signs as to jeopardize the safety of linemen who must climb our poles in all kinds of weather . . . at all hours of the night and day.
We will continue to remove all signs, nails and other hazards as promptly as possible but we need your help in keeping our poles clean. So please . . . DO NOT PASTE, NAIL OR ATTACH, IN ANY WAY, ANY KIND OF SIGN TO A TELEPHONE OR ELECTRIC POWER POLE.
BALTIMORE GAS AND ELECTRIC COMPANY

Baltimore Gas and Electric Co. has been "moderately" successful with its attempts to get information such as that shown above into the minds of its customers.

There are several types of information pieces.

One would be a welcome to new customers. There can be no specific objection to this: it is a nice gesture, sometimes expensive, and probably does some good. It is the kind of message which has been overdone in recent years. It has lost its punch and no longer carries the power to call up enthusiastic response or popular approval. There is little chance, however, that it would cause unfavorable reaction. The decision to send a welcome pamphlet will depend on what value any individual company might place in it.

Many information efforts deal with something a company is going to do or wants the customer to do *now*—or at some future time. If influencing peoples' future actions is the major objective, the road is often narrow and bumpy. It is most difficult to get people to do something unless the stakes are high and at least seemingly weighted in their favor. Response is usually quickest when the action required is to *prevent* something rather than to *do* something. For example, it is easy, and often desirable, to join a book-of-the-month club. The literature is appealing, the free gifts and bonus books hard to resist, and the effort necessary to join is made as easy as possible: just sign a self-addressed, postage-paid, airmail card and drop it in the letter box. Now, look at the other side of the picture, after the joining up. In

order not to receive a current selection which the member does not want, he is required to mark his intention on a rejection slip and prepare, stamp and mail an envelope. In both instances, the stakes are high—only in different ways. The latter will receive a better response because the person must prevent something.

High Response

Another example of high response is an information piece prepared by Baltimore Gas and Electric Co. which involves gas house-heating customers. In this program, customers are urged to do two things: (1) leave their pilots on; and (2) let the company know what they intend to do.

The letter of explanation and the enclosed folder not only emphasize the advantage of leaving the pilot on, but also point out the disadvantage to customers of the company not being able to light all pilots on the first cold day. Moreover, too many customers have already actually experienced this disadvantage in previous years. This program was started in 1954. The percentage of people leaving pilots on all summer, and the percentage depending on the company to light their furnaces have been:

Year	*% Pilots Left On*	*% Asking Co. to Light*
1954	50.7	7.8
1955	59.	5.5
1956	74.	3.7
1957	80.	3.1

Now using the figures from 1958, we find that nearly 84 percent of Baltimore's gas heating customers follow the company's advice. Another large percentage light their own pilots. Leaving the pilot on or lighting the furnace yourself both fall into the group of preventing something: the inconvenience of being without heat. This is one of the reasons why Baltimore gets what, for most direct mail campaigns, would be an amazingly large return of the post cards indicating customers' intentions.

Still another example, also from experience in Baltimore, but this time of what *not* to do, is a booklet entitled "Call This Number."

Baltimore had—in fact, still has—a terrific problem of peak loads in the telephone division of the Customer Relations Department on Mondays, *especially* between the hours of 9 to 11 a. m. "Call This Number" booklet was designed primarily to be sent to those customers who called between these hours on Monday. It was thought that this might be a good means of educating those who were calling at this peak period, and prevent, to some extent, their calling again at the same crucial time.

Program Discontinued

After about two years of use, this program was discontinued. Not only did it require extra effort on the part of the telephone representatives and the expense of printing and mailing, but there were no results. Looking back, the company understands why:

- Only a very small number of those customers who do call on Monday find it necessary to call a second time, at least within a reasonably short period. Many customers have never contacted their utility company more than once in 10, 15, 20—yes, even 25—years or more.

- Sometimes the caller is the working member of the family calling from other than his residence, and neither receives nor sees the pamphlet which is mailed to the home.

- Those persons calling on Monday between 9 and 11 are only a few out of the grand total who call during the week. None of these other callers would receive the booklet. They would not be educated about the Monday problem should they later have reason to call a second time.

- Note that this type of information piece calls for action at some indeterminate time in the future. That's why it was never recommended for mailing to all customers.

- And, last, there was also the possibility of misunderstanding; where the customer does have an emergency situation, we do not want the call postponed. This phase was covered in the booklet. It is mentioned here only because it points up the fact that whatever we do there are usually exceptions. Such things make *simplicity* difficult—and simplicity, as we will see, is one of the keys to a successful information piece.

The five shortcomings listed are the factors that foredoomed this particular effort to failure. The most important of these factors takes us back to individual memory ability. Most persons who would receive the booklet would have no intention of calling again. They would probably dispose of the booklet immediately and, from what we have seen on the memory curve, less than 35 percent of the information learned would be remembered after six days. In the two years the booklet was used, the peak telephone problem remained unchanged. It had to be concluded, therefore, that the booklet was not accomplishing its purpose. The serious problem of Monday morning peaks cannot be ignored and something should be done about it, but the search for a solution will apparently have to include more than an information booklet.

Must Recognize Limitations

Above all, we should recognize the limitations of information pieces. For example, it is certainly impractical, and virtually impossible, to prepare one book or pamphlet which tells everything to everybody. Not only does the expense argue against it, but it would be too complicated for most people to read, understand and use. It would be almost impossible to keep it simple or up to date, and unless we did, its usefulness would fade away.

No one can make everyone else fully read, understand and use what is given to them. Getting even a fair percentage of the people to read an information piece partly, much less fully, expecting them to completely understand what they do read, and even more, to use it advantageously, is beyond reasonable hope. Much of what is given in such a book is not immediately useful to everyone. Not only will they forget most of what they did read, but will also forget where they placed the booklet for safekeeping.

Delivery of informational material is a real problem with many tangents. We have to decide if it is going to all customers or to a certain class—if to a certain group, then there is the problem of separating all others.

If we want to be sure that the proper person receives it, the best method would be personal delivery. This is rarely practical, not only because it is time consuming and expensive, but for other reasons, such as:

- Inability to deliver it to everyone at about the same time.
- We could not be sure that the person who accepted it would be the one who would make the best use of it.
- Some people are never home—others only occasionally.

The best way to overcome the problem seems to be to mail most information pieces and take our chances that they will be properly received and used.

Unless an information booklet is effective, it isn't a worthwhile project. Proving or determining its effectiveness is a most difficult job. If we produce material without knowing the effect it will have, we must rely largely on our own judgment. If we send out information to our customers, then consideration should be given to three all-controlling factors:

- *Timing*—According to Edward H. Burgeson, Director, Retail Department, Bureau of Advertising, *Editor and Publisher*, four out of five retailers will needlessly miss important traffic in 10 out of 12 months because of hit and miss advertising planning. Careful planning of release time is needed in our business, too. If we want to convey information or instructions about "leave your gas furnace pilot on during the summer months," it must be done at the time of peak opportunity. This would be just prior to the natural time that the action of turning off the pilot would be taken by customers. Similarly, publication of a rate increase proposal would normally come at the time when the most benefits can be derived.

Timing Is Important

The nature of our business, however, does not always permit taking full advantage of the peak opportunity. For instance, if we would like to send out an instructional pamphlet telling customers to give us three days' notice prior to moving, the best result could be expected from those who would receive it within a few days prior to moving—certainly not more than a week or so. As the time space between receipt of the notice and actual moving date increases, the less effective the instruction becomes.

- *Simplicity*—A utility's family of customers is much like an army's corps of personnel. Both include all levels of intelligence. It is difficult, maybe impossible, for either army or utility to completely and accurately segregate the classes. So simplicity becomes the byword: instructions so basic, so clear, that hardly anyone can misunderstand. It is such an important factor in army circles that it is never allowed to become stale. The most recent wrinkle from Fort Benning, Ga., is the almost constant use by everyone on the post of the simple little verb "Kiss"—K-I-S-S. "Keep It Simple, Stupid!" It wouldn't hurt our information pieces a bit if we were always mindful of this directive, too. Keep it visual. Keep it simple.

What makes simplicity so difficult is that our type of business presents many technicalities and exceptions. There are degrees of importance in our requirements, unwritten practices, and exceptions to most rules. It is difficult to decide what we want to explain and how much. We know we can't spell out all the exceptions without confusing the main point; therefore, in order to keep it simple, we may not be able to tell the whole story. That, of course, could cause difficulty.

- *Repetition*—This is a well-known principle, used extensively in the advertising field. Dr. Burtt says, "If an advertiser presents his brand with greater frequency than the brand of his competitors is presented, the prospects are more likely to think of his trade name when they need the product in question." This principle is especially true for customer information material. If it can be repeated at frequent or periodic intervals, the results will show steady improvement.

So Little Time

We cannot ignore what we see and experience every day in our own lives—in the lives of our associates. Everyone is so busy doing so many things that there isn't much time for any one thing. We are forced to find easy ways out. So we throw into the trash can advertisement or information material without even reading it, usually with little thought for its possible future usefulness. A quick glance to see who it's from; a flash decision that we don't need that particular service or information now is sufficient reason for our quick impulse. We won't clutter our cabinets with information that isn't needed now but which is easy to get later, when and if it is needed. Here's an example: every day women call department stores to get the price of bed sheets—the same stores that send out linen catalogues regularly.

Customer information pieces, at certain times, have their place. Some of them do some good. Most of them won't hurt us, except, maybe in our budget.

Service has a higher rating in our thinking about things that make for good customer relations. We don't have to tell customers our product is good; they use it every day. They know it's good and they don't usually worry about it. They only become concerned when our product or their equipment fails. If we are able then to give good, quick service, in a courteous manner, our position with customers is likely to be secure. If we succeed in giving good service, you can be sure it is due, in large measure to our employees. They are the backbone of our companies. Customer good will and favorable public opinion are the result of good employee-customer contacts. It is vital that employees' attitude reflects our companies' sincere intention of treating customers right. We can hardly do too much to see that our employees are customer-minded. We should keep them reminded frequently, through training courses, films and film strips, letters and pamphlets, and company newspapers, of their importance in determining public opinion.

New Reminder Available

Recently, a new reminder became available: "The Customer—My Responsibility." This publication came out of recent AGA-EEI Customer Relations Committee work. It has been well received throughout the industry.

If our employees are well informed, there is likely to be less need for customer information pieces.

Tax Awareness Outside of the Tax Department

By William H. Harrison, Jr.
Controller, Texas Electric Service Co.

All Departments Must Cooperate with the Tax Department if It Is to Carry Out Its Responsibilities, Mr. Harrison Points Out

WE have all come to recognize that this is the era of the specialist. At least all of you family men, in your personal experience, have come to the realization that the medical profession is highly specialized. And it is much the same with the legal profession: you have no doubt heard the expression "law corporation"—a firm with an attorney specializing in everything but general practice. So also does the accounting profession have its specialists. You are acquainted with some of the specialists your certified public accounting firm can make available to your company. In turn the accounting organizations of the larger utility companies now include a host of staff specialists—specialists in systems, budgets, finance, regulatory matters, internal auditing, to name a few, and, of course, tax specialists. All of these specialists are rather expert in their chosen field, and they need be if they are to be of real assistance to their less experienced associates and of real value to their companies.

A Time to Call on Specialists

Really what we need to come to understand, is when to call on the specialists for assistance. Our family doctor has learned this. And we, in turn, have learned when to call the family doctor. I hope this knowledge carries over to our work day as well. We need to know when to suggest that one of our employees might do well to consult the company doctor; and also, of course, when to submit a matter to the firm's attorneys; when to consult with the local partner of our public accounting firm; and we should know when to check a special situation or unusual transaction for possible tax effect. In fact that is the key to the whole matter—when to submit a special situation or unusual transaction to the tax department. Should you neglect to bring the tax department in on a particular problem, you may regret some action you take on your own responsibility, and this neglect may cost your company expensive 100-cent dollars.

Federal income tax takes the larger part of our company's tax dollar; other taxes vary considerably in the many tax jurisdictions represented here. Let us limit the discussion to possible areas where the tax department may be of assistance; and to a discussion of problems —that is to questions rather than answers. All too often minor variations in somewhat similar situations can cause a different tax result. Your tax department can help you see when facts may affect answers. At best we can only hope to reach a better understanding concerning when to see the doctor; we certainly cannot hope to know what the diagnosis will be or what action should be taken. Possibly we can learn to identify tax symptoms; let's leave the diagnosis and prognosis to the tax specialists. Actually, I hope we can understand a little better where a tax problem may be lurking and when to call on our associates in the tax department—in short, to "Be Aware of (potential) Tax Problems."

It might help a little to appreciate what the tax department is up against. Its principal duty is not simply a matter of filing a tax report. The tax department does not just take the results of the year's operations and report them to Uncle Sam together with a little check covering the amount due. For one thing, the check is not so little; your company's annual Federal income tax bill is probably well over half of its net income available for preferred and common dividends and for reinvestment in the business. Uncle is a full partner when it come to sharing in our profits.

Federal Income Tax

To put it another way, Federal income taxes account for approximately 13 cents out of every dollar of the average utility's revenue; other taxes absorb another 10 cents of this revenue. The worst of it all is that tax liability is not determined by the filling out of the tax return each spring; it is determined prior to Dec. 31.

An address before the National Conference of Electric and Gas Utility Accountants, Chicago, Ill., April 21, 1959.

In fact it is determined as we handle each transaction during the year. The die is cast by the end of the year. That is why it is so important to bring up any special situations and unusual transactions for tax review as they occur; it may be too late when our tax men finally stumble on the situation.

It may also bear mentioning that the way a transaction is recorded in the books of account, the story that goes with it, and the order of events can affect taxable income and tax liability. Many times we have an option—there is frequently more than one way to handle a transaction—and sometimes the choice will result in a different tax effect. At any rate the choice may help your company substantiate its position if a tax question arises at a later date. When there is a possibility for doubt, even when you think you are sure, but the situation is not commonplace, talk it over with your tax men. Sometimes it may even be necessary for them to call in the company's tax consultants, attorneys, or public accountants. Some of these questions can be complicated. Many times the courts do not agree; frequently all the judges on the Supreme Court do not agree.

Occasionally, too, you may be called on to help the tax department; possibly to sit in on some phase of a tax negotiation; probably something closely related to your regular work. A knowledge of technical considerations and proper timing and emphasis is needed in these circumstances. The uninitiated may unwittingly do more harm than good. Take your cue from your tax man in such negotiations. Do not risk endangering your company's position. If you are requested to furnish accounting data or prepare statements for tax purposes, these can be reviewed before they are used, but your cooperation will be appreciated.

You have observed over the years the significant influence that the regulatory agencies have had on our accounting procedures. There is also apparent the influence of income tax accounting on normal accounting practice. Both have seemed to do much to mold the recent developments in utility accounting. Perhaps you stand with those who feel that income tax accounting should not dictate bookkeeping procedures. Although I may agree, the tendency is still present. It can make differences between book and tax treatment less troublesome to deal with and sometimes helps minimize the cost of keeping special tax records. Tax accounting requirements should not dictate other accounting decisions, but they must be reckoned with. To avoid confusion and attain operating efficiency, tax requirements need be given proper consideration.

100-Cent Dollars Involved

It may be well to recall the 100-cent dollars involved in Federal income tax decisions. Although we must be economy minded in all of our operations, we may as well be realistic. A savings in regular operating expenditures—expenses or maintenance—is only a savings in 48-cent dollars. As long as taxes remain at the present high rate of 52 percent, and we surely cannot foresee the end of high Federal taxes, we deal in 48-cent dollars as far as our regular operating costs are concerned. This should not encourage us to be spendthrifts, but you cannot get away from the fact that 48 is far less than 100.

We hear a lot about utility sales effort, and, of course, we all want our companies to increase sales, to grow, and to be of ever-increasing service to our customers. But it may be well to realize that in our industry it takes between five and six dollars of sales revenue to equal the net income derived from one dollar of tax savings. This may serve to remind you of why your management is so tax conscious and why your tax department feels its responsibility so keenly.

Even though we all agree that we need more efficient control of operating costs and more sales dollars, the fact remains that when we say our new accounting system will save the company $100,000 per year, we are really talking about $48,000; and when we say that the plant expanding on the outskirts of town will increase use of our service by $100,000 per year, we are talking about a net after taxes of on the order of $17,000 to $20,000. And to get either of these benefits, we may have to make a significant investment in plant.

Ever-Changing Field

Although I cut my teeth on tax problems, and was once even so bold as to lecture on Federal taxation, I must confess that it is easy to lose ground to those who specialize in the subject. Taxation is an ever-changing field of study. Nevertheless I have always contended that determination of Federal taxable income was largely a logical process, even though based on a statutory concept of income. Of course, some of the inequities introduced by the Congress and the courts defy comprehension. You have probably noted that most of the items you find in your company's income statement are also found in its tax return. The notable non-deduction item is the provision for Federal income taxes. I do not mean to suggest that all items receive the same treatment for book and tax purposes, but rather that the same items are usually involved. As a matter of fact most items do, however, receive the same treatment for book and tax purposes. It is the exceptions that count. Even though these exceptions may be a small percentage, they can involve large amounts of those 100-cent tax dollars. It is with these special situations or unusual transactions that the tax department can help you.

Generally speaking, book income is subject to Federal income taxes. The year may differ and special capital gains rates may apply, but when it is book income, it is usually taxable income. Also, book expense items are deductible for Federal income tax purposes. Again the year may differ and the method of allocation or computation may vary, as is often the case of depreciation and, of course, amortization of emergency facilities, but when it is book expense, it is usually a tax expense item.

The corporation income tax return provides for a reconciliatian of these differences between book income and taxable income. For a particular utility, in any one year, this usually includes relatively few items. But they are very real differences and involve those important 100-cent dollars, and they will sometimes involve unusual and very significant amounts. Nevertheless, it is safe to assume that the commonplace transaction, the usual income or expense item, will receive the same treatment for book and tax purposes, except for some

routine differences which occur year after year. But for these a regular pattern of tax treatment can be readily established. The unusual, the exceptions, are not so easy to identify nor so easy to cope with.

What are some of the exceptions that may not fit the usual pattern? Call to the attention of your tax staff any transactions involving the following type of items, particularly if unusual in any respect:

- Damage claims, particularly large casualty losses and claims not covered by insurance.
- Extraordinary maintenance or repairs.
- Bad debts, worthless securities, related valuation reserves, and recoveries.
- Deposits or advance payments made or received.
- Contributions and donations to charitable organizations, the government, or associations interested in legislation; particularly gifts of property.
- Accrual dates for property tax and certain other expense items.
- Retroactive transactions involving either income or expense.
- Book surplus entries.
- Special reservations of surplus or income.
- Surplus reserves, particularly those for contingencies.
- Dividend income, whether or not from subsidiaries.
- Interest income or discount on government obligations.
- Old outstanding checks which are cancelled.
- Pension and certain other employee benefit plans.
- Advertising expenditures are of particular current interest.
- Research and development expenditures.
- Natural resources, such as gas, oil and timber.
- Contracts of all types, but particularly those of an unusual nature.
- Acquisition or sale of operating properties, particularly those involving operating systems.
- Sales of other real or personal property; these are subject to widely varying treatment.
- Condemnation of property and forced sales of property under threat of condemnation.
- Exchanges of property and so-called "trade-ins."
- Lease agreements for either real or personal property, particularly those containing an option to purchase.
- Improvements to leased property.
- Depreciation, amortization, obsolescence, abandonment and demolition of assets.
- Construction or retirement of emergency facilities certified for accelerated amortization.
- Charges to construction such as interest, taxes, pensions, etc.
- Rights-of-way and clearing costs.
- Contributions in aid of construction, if unusual.
- Franchise agreements or statutes granting franchises, and related expenses.
- Regulatory matters involving taxes, including commission reports as well as rate case data.
- Rate refunds or impounding of excess rate charges.
- Common dividends paid—particularly those which may not be out of earnings or profits for tax purposes.
- Preferred dividends paid—special provisions apply to certain utility issues.
- Stock dividends or retirement of outstanding stock.
- Bond interest, premium, discount and expense.
- Refinancing or refunding of debt or preferred stocks.
- Consolidations, mergers and subsidiary company transactions; and liquidations or dissolutions.
- Corporation organization and capital stock expenses.

Transactions falling in the above categories should receive tax review during the formulative stage, or at least before any final action is taken. Although this is at best only a partial list, it gives some idea of the wide variety of transactions which may involve a tax problem. This is particularly true if the transaction involves change or if it is new or unusual. Our large-volume items affecting income—normal operating revenues and expenses—are not listed; the tax treatment of these items is, for the most part, well established. It is also well to remember that some of the transactions listed may affect taxes other than Federal income taxes.

One occasion when tax review is particularly desirable is when some change in method of operation is contemplated or when a change is to be made in the manner of handling an item which might involve tax considerations. All systems changes do not, of course, involve potential tax problems. However, decisions such as the following require tax review: change from ownership to leasing of a particular type of property; change in employee benefit plans; discontinuance of certain types of records; destruction of old records; change in method of handling employees' business expenses, etc. When suspected changes are contemplated, talk them over with the tax staff. Conversely, you may sometimes be requested to incorporate certain data in your regular accounting system to accommodate tax accounting requirements. Try to help the tax department when it has suggestions of this nature.

One cannot specialize in taxes as a part-time endeavor. At least I am willing to admit I cannot. Most utility accountants received a brief course of instruction in Federal taxation while in college, but that was merely an introduction. We would all do well to attempt to keep abreast of current tax developments and to rely on our tax staff when we think we may have a potential tax problem. Knowing something about aspirin is a poor substitute for the family doctor when we may have a serious disorder. What we really want is preventive medicine—preventive tax administration.

In the usual large utility today, the tax staff cannot review every journal entry, disbursement voucher, contract, etc. They must depend on other members of the team. Just as the bookkeeper calls attention to accounts that have not been paid, the internal auditor to methods that may need revision, the budget accountant to overexpenditure on certain items, all of us must call attention to situations that need tax review. The tax department needs your help to see that the company has every opportunity to arrange its affairs in such a way as to avoid paying unnecessary taxes. The Supreme Court has guaranteed all taxpayers this right; we should conduct ourselves accordingly. The every-day chore is much more

a case of protecting our income within the limits of the law than one of searching for windfalls. It seems that we are more deserving of censure for failure to take advantage of every opportunity to minimize our company's tax bill than we are of praise for doing the job that is expected of us.

Company tax administration is largely a job of seeing that we pay all, but not more, than the law requires. This is not a simple task. The law is complex, the clarifying regulations are not always clear, and the decisions of the various courts are not necessarily conclusive nor equitable. Nor is it a simple task to keep up with the constantly changing tax laws and regulations, and the many tax cases decided by the various courts having jurisdiction. If as much were printed each week about every phase of our business as is printed on the subject of taxes, some of us would have to give up golf, and some of our wives would have to give up bridge and take up gardening.

You will find the men in your tax department are dedicated to their work. They are well informed on their specialty. They are ready to cooperate with you whenever they can be of help. They are anxious to be of service to you and your company. But as you know, many times the type of transaction which may have a tax effect will originate with just a few people, in almost any department of the company, and sometimes even in high places. So it will not always come to notice as soon as it should.

Although it is also part of the tax department's responsibility to develop tax awareness in all departments of the company, to inform top management, as well as engineering, sales, operations, general services, etc., of the types of situations that may have a tax angle, the tax men particularly need your help in getting other departments to bear in mind the possibility that some of their transactions may have a tax consequence.

Those of you who have regular contact with top management and other department heads can do much to help develop this tax awareness. Many of the people in other departments will not have your familiarity with tax matters, so you will be helping them and your company, as well as the tax department. Remember those 100-cent dollars are the big ones, so do not take a chance and overlook an opportunity. Your tax staff needs the help of all departments in the company to carry out its responsibility and it is prepared to be of service when it can.

Report on Extra-High-Voltage Cables

(*Continued from page* 206)

formers which permit test voltages as high as 290 kv phase to ground (500 kv phase to phase); General Electric with the 10,000 kva, 23 to 69-kv supply transformer; Anaconda with aluminum bus, and a number of other equipment suppliers with whom negotiations are in progress. To facilitate communications with the suppliers, an Electrical Equipment and Material Advisory Committee is being formed.

Station Supply

The test station will be supplied with electric service from the 23-kv system of the New York State Electric and Gas Corp. The interest and cooperation of the engineers and management of this corporation in solving the difficult distribution problem of supplying the large capacitive load of the test station are particularly appreciated by the Steering Committee.

Field Test Schedule

The field test program is scheduled to extend over a period of three years. The first two years will be used to evaluate the suitability of the cable systems for use in power systems in this country, and the third year will be used to determine the ultimate capability of the underground circuits.

Test voltages will be supplied by the "Tidd" transformers. The circuits will be brought to and maintained at the scheduled conductor temperatures by current transformers. Both constant temperatures and cyclical temperatures will be applied during each step in test voltage.

The possible change in power factor of the cable and accessory insulation at various temperature levels has been accepted as the criterion of performance, aside from the contingency of possible failure at some elevated temperature and overvoltage. Particular emphasis, therefore, is being placed on the significance of the high-voltage bridge measurements of insulation quality at each temperature.

Once the test results point to acceptable conductor temperature levels and voltages for the cable designs, the power transmission capabilities may be computed using accepted cable rating techniques, cable parameters measured in the manufacturers' laboratories, and other limiting parameters fixed by the nature of local geographic and physical conditions of installation.

Construction Schedule

The ground breaking was scheduled to start at the Cornell test station site in April, 1959. It is expected that the station will be completed by the fall of 1959. Most of the cable systems to be tested will also be completely installed by late 1959. It is probable, however, that some samples will not be ready for test until the spring of 1960. During the interval between the fall of 1959 and spring of 1960 it is planned that preliminary testing be done at lower voltages to gain experience and facility in the operation of the station and in the making of measurements.

How a Digital Computer Can Aid the Transmission & Distribution Engineer

By L. W. Coombe

Compu'er Application Engineer, The Detroit Edison Co.

THE digital computer is now aiding engineers in many of the electric utility companies, and there is definite evidence that today it can aid engineers who have not yet taken advantage of this important tool.

Progress in the application of electric utility engineering problems to digital computers has been exceptional in the past three years, and is becoming increasingly more noticeable at present. To substantiate this statement, one need only scan the program of papers presented at the past AIEE winter meeting or recent issue of electric industry trade magazines and it will be evident that computers are here to stay.

Since it is fairly obvious that digital computers are here to stay, the next logical questions for a power company engineer are:

- Can a digital computer be of assistance in my work?
- How do I use a computer?

Capabilities Compared to Rental

In attempting to answer this question, "Can a digital computer be of assistance in my work?" let us first look at the capabilities of medium-size and large-size computers as compared to the rental cost. We all remember the days when we were youngsters and used to go to the candy store with a penny in our hand to see what we could get for our money. What can a computer give us for this same penny?

It may be surprising that for one cent a medium-size computer such as an IBM 650 or a Datatron 205 will perform 150 operations; whereas, for this same penny a large-scale computer such as an IBM 704 will perform 1200 operations. These figures are approximate and represent an average for all operations that a computer can perform. The term operations, as used here, would include addition, subtraction, multiplication, division, transferring, testing, and other basic manipulations of numbers that are considered to be 10 decimal digits in size. The computer costs are based on normal rental charges at a computer service bureau. Of course, if your company can justify its own computer, the amount of work obtained per penny is even higher. Where else can you get so much for one cent nowadays?

If we agree that this is a lot of work for our money, the next question is, "What kind of problems can a digital computer handle?" Probably the best way of answering this question is to conduct a quick survey of some of the problems that are now being solved on digital computers by transmission and distribution engineers.

Distribution Circuit Analysis: Computer programs have been developed for both medium[1] and large-scale[2, 3, 4] computers that will analyze distribution circuits from the standpoint of voltage drop, losses, and equipment loading. One such program[2] written for a large-scale computer also determines the costs of alternative types of voltage corrective equipment including the economic effect of the losses in the circuit.

Load Flow Studies: Digital computers are now competing very favorably with network analyzers on this type of problem. A number of companies are presently conducting a majority of their load-flow studies on digital computers. The load-flow problem has been programmed for small,[5] medium,[6, 7] and large-scale computers.[8, 9] As an indication of the speed at which a large-scale computer can produce solutions to load-flow studies, a published report stated that complete solutions were calculated at the rate of one every 1.2 minutes for a 50-bus, 104-line system. The total computer and tabulating costs for this study were approximately $16.00 per case. This is particularly impressive when it is pointed out that system losses are calculated in addition to all bus voltage magnitudes and angles and real and reactive power flows for both terminals of every line.

Presented at the EEI Transmission and Distribution Committee Meeting, Chicago, Ill., Feb. 12, 1959.

[1] "Digital Computer Applied to Electrical Distribution System Planning," E. A. Strausser. AIEE Transactions paper 58-1088, presented at Power Industry Computer Application Conference, September, 1958, Toronto, Canada.

[2] "Distribution System Primary—Feeder Voltage Control, I—A New Approach Using the Digital Computer," H. E. Lokay and D. N. Reps. AIEE Transactions paper 58-824, presented at Summer General Meeting, June, 1958, Buffalo, New York.

[3] "Distribution System Primary—Feeder Voltage Control, II—Digital Computer Program," D. N. Reps and G. J. Kirk, Jr. AIEE Transactions paper 58-891, presented at Summer General Meeting, June, 1958, Buffalo, New York.

[4] "Distribution System Primary—Feeder Voltage Control, III—Computer Program Application," H. K. Amchin, R. J. Bentzel, and D. N. Reps. AIEE Transactions paper 58-827, presented at Summer General Meeting, June, 1958, Buffalo, New York.

[5] "The Royal-McBee LGP-30 Computer Solution of Electrical Load Flow," W. H. Osterle and M. Kaye. AIEE Conference paper CP58-1104, presented at Power Industry Computer Application Conference, September, 1958, Toronto, Canada.

[6] "Automatic Calculation of Load Flows," A. F. Glimm and G. W. Stagg. AIEE Transactions, Vol. 76, Part III, 1957, pp. 398-402.

[7] "Digital Solutions for Large Power Networks," R. J. Brown and W. F. Tinney. AIEE Transactions, Vol. 76, Part III, June, 1957, pp. 347-351.

[8] "Experience in Computation of Load-Flow Studies Using High-Speed Computers," H. P. St. Clair and G. W. Stagg. AIEE Transactions paper 58-1100, presented at Power Industry Computer Application Conference, September, 1958, Toronto, Canada.

[9] "A New Automatic Program for Load-Flow Studies on the IBM 704," M. S. Dyrkacz and F. J. Maginniss. AIEE Conference paper CP58-1102, presented at Power Industry Computer Application Conference, September, 1958, Toronto, Canada.

Transient Stability Studies: This is a problem that is very time-consuming and laborious when done on a network analyzer. Recently programs have been developed which will allow this type of study to be done on medium[10] and large-scale computers.[11, 12] The programs written for large-scale computers show the most promise and indicate a definite saving in cost over the network analyzer approach. These programs will handle systems that consist of up to approximately 50 machines, 200 buses, and 350 line elements. At least one of these programs[12] is also written to handle induction and synchronous motors as well as synchronous generators.

The calculating time experienced when using such programs is nothing short of amazing to those who have been through the process on a network analyzer. For example, the transient behavior of one system consisting of 16 generators, 71 buses, and 89 lines was studied over a time interval of 0 to 0.6 seconds. During this time the fault was applied, removed, a line was opened and then reclosed. The total time for solution of the swing curves for all machines over this time interval amounted to aproximately 17 minutes. Another stability program written for a large-scale computer was able to calculate swing curves for a system consisting of 46 buses, 68 line elements, 11 synchronous machines, and 34 induction motors over a time interval from 0 to 0.6 seconds in a total time of 13 minutes.

Short-Circuit Studies: Here again the digital computer is competing with the network analyzer. Computer programs to calculate system short-circuit currents have been written for small, medium,[13] and large-scale computers.[14] Some of these programs appear to be very promising and it is expected that in the near future extensions will be made to include many of the relay calculations that are now done by hand.

These four applications are fairly standard or routine problems that the transmission and distribution engineer encounters, and are generally large and complex in nature. However, these are not the only types of studies that are being solved on computers. Actually, very substantial savings can result from utilizing a digital computer for various problems that are less complex or that arise not too frequently. Among the many programs that have already been written and utilized, the following are cited as examples:

- Distribution Transformer Loading.
- Allowable Weight of Pole-Top Transformers.
- Phase Balance on Distribution Feeders.
- Transmission Line Impedance Calculation.
- Wire Size and Tensions.
- Outage Probability.

[10] "Digital Computation of Induction Motor Transient Stability," J. L. Gabbard, Jr. and J. E. Rowe. AIEE Transactions, Vol. 76, Part III, 1957, pp. 970-977.

[11] "A New Digital Transient Stability Program," M. S. Dyrkacz and D. G. Lewis. AIEE Transactions paper 59-222, presented at Winter General Meeting, February, 1959, New York, New York.

[12] "Calculation of Transient Stability Problems Using a High-Speed Digital Computer," G. W. Stagg, A. F. Gabrielle, D. R. Moore, J. F. Hohenstein. AIEE Transaction paper 59-73, presented at Winter General Meeting, February, 1959, New York, New York.

[13] "Digital Calculation of Short-Circuit Currents in Large Complex—Impedance Networks," L. W. Coombe and D. G. Lewis. AIEE Transactions, Vol. 76, Part III, February, 1957, pp. 1394-1397.

[14] "Digital Calculation of Power System Networks Under Faulted Conditions," R. T. Byerly, R. W. Long, C. J. Baldwin, Jr., C. W. King. AIEE Transactions paper 58-1099, presented at Power Industry Computer Application Conference, September, 1958, Tororto, Canada.

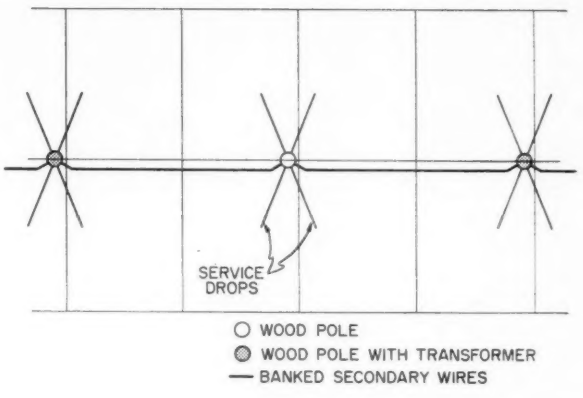


Figure 1—Distribution Layout for New Housing Subdivision

- Short-Circuit Bus Stress.

As an illustration of how a digital computer can be of assistance to the transmission and distribution engineer, here is a program that was recently completed at The Detroit Edison Co.

The primary purpose of this computer program was to calculate economic guides for the design of distribution systems for new housing subdivisions. This program took into account loading and voltage drop considerations as well as various transformer and secondary wire sizes. Figure 1 offers a better look at the problem. This figure represents a portion of one block of a new housing subdivision. The rectangles represent lots, the open circles represent wood poles, and the solid circles represent wood poles with distribution transformers. The heavy solid line between poles represents banked secondary wires. The radial lines emanating from the poles represent service drops to the customers' homes.

Planning Engineer's Problem

The problem for the planning engineer in a case such as this is to decide: (1) what distribution transformer size should be used, (2) how many poles apart should the distribution transformers be mounted, and (3) what secondary wire size should be used. This assumes that the distance between poles and the average loading per customer is known. The specified limitations in this problem were that the transformer loading should not exceed 160 per cent of the transformer rating, that the transformer plus secondary voltage drop should not exceed 6 volts, and that the distance between transformers should not exceed 1000 feet. Equations were presented for cost per pole, transformer loading, and transformer plus secondary voltage drop in terms of such items as load per pole, transformer size, secondary wire size, span length, and number of spans between transformers.

Sixty different values of loading were to be considered in this study with loads per pole ranging from 0.5

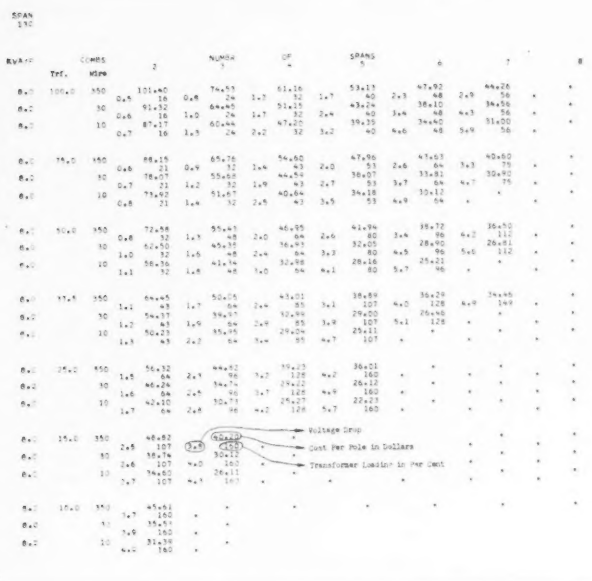


Figure 2—Sample Output Sheet

to 80 kva. There were seven available transformer sizes, three available secondary wire sizes, and the number of spans between transformers could vary between two and eight. In addition, span lengths from 80 to 220 feet were to be considered in increments of 10 feet.

With this many variables, there are 132,000 different possible combinations to consider. Since there were three equations for each combination, the maximum number of equations would have been close to 400,000. However, by taking advantage of the information supplied regarding loading, voltage drop, and distance between transformer limitations, it was possible to utilize the logical ability of the digital computer to reduce considerably the actual number of equations solved.

This was done by first determining for the combination under consideration the distance between transformers. If this distance exceeded 1000 feet, the combination was immediately disregarded. Otherwise, the transformer loading was then calculated. If this exceeded 160 percent, the equations for voltage drop and cost per pole were not solved for this combination and it was disregarded. If the loading was satisfactory, the voltage drop calculation was then performed. When the voltage drop exceeded 6 volts, the cost per pole equation for this combination was disregarded, and a new combination was considered. However, if none of the limitations was exceeded, the cost per pole was calculated, and all values for that combination were printed.

Figure 2 illustrates a sample of the output format and indicates the information produced by the computer. This is for a span length of 130 feet and a given loading per pole of 8.0 kva. The cost per pole, transformer loading in percent of rating, and voltage regulation in volts are given for each combination which satisfied the three requirements. None of the results was printed for combinations where any of the limitations were exceeded. As a matter of interest, the computer required slightly less than one minute to calculate all the values shown on this figure, and overall, 900 different pages of results were produced.

Program for IBM 650

In order to give some idea of the expense required to produce these results, the programming and debugging time and computer time are presented. First of all, it should be noted that this program was written for an IBM 650, a medium-size digital computer. Approximately 10 man-days were required to write and check the program for this problem, and seven computer-hours were required for the complete production run which calculated the desired results for all possible combinations of the variables.

It was estimated that it would have taken at least two man-years to arrive at similar results to this problem by long-hand methods. Even then the accuracy of these results might be subject to question. It is expected, also, that the standardization in planning practices for distribution systems for new subdivisions will result in appreciable savings annually. A rather detailed description of this problem has been presented to illustrate one of the many similar problems that can be solved profitably by a computer, and to give a little insight into how a computer solves such a problem.

How Do I Use a Computer?

Certainly, in order to use a digital computer a transmission or distribution engineer must know something about the computer, such as its capabilities, operations, etc. However, with the development of programming techniques that are available today, it is surprising how little a person must know about computers in order to write workable programs for solving many engineering problems.

These new programming techniques are referred to as compilers, and enable the engineer or programmer to write his problem in a series of statements that very closely resemble the equations that the computer is to solve.[15] These statements must be written in a standard format; however, very little time is required to learn to use such programming techniques. When the statements are punched in cards or paper tape, as the case may be, the computer then takes over and digests this information and produces a program written in its own langage that will solve the problem. Then it is only necessary to feed this machine language program back into the computer along with the input data for the particular problem in order to obtain the results desired.

This method of programming a problem for computer solution requires a minimum of training on the part of the engineer, and enables him to obtain very satisfactory results for many of his problems that are adaptable to computer solution. There are some cases, however, where programming directly in actual or

(*Continued on page* 226)

[15] "The Use of Compiler Programs to Solve Power System Problems on a Large Digital Computer," J. T. Carleton and C. J. Baldwin, Jr. AIEE Transactions paper 58-1084, presented at Power Industry Computer Application Conference, September, 1958, Toronto, Canada.

Youth Conference on the Atom

Electric Utility Companies Sponsor Meeting in Atlantic City

A. H. McDowell, Jr., second from left, President of Virginia Electric and Power Co., scans program at Youth Conference on the Atom in Atlantic City with teacher and students sponsored by the company.

THE role of the peacetime atom in providing fuel to produce electricity, to propel vehicles, to solve agricultural problems, to contribute to medical science and generally to improve the world's standard of living was described to more than 600 high school science students and teachers at the first Youth Conference on the Atom, which was held in Atlantic City, N. J., April 30-May 1.

The conference, sponsored by 60 electric utility companies, included addresses by many of the nation's leading scientists, physicists, and atomic experts, panel discussions, a workshop and an Atomic Energy Commission exhibit showing the progress of the peacetime atom in various fields.

E. M. Naughton, President of Utah Power & Light Co., and Chairman of the Steering Committee of Electric Companies Public Information Program (PIP) was moderator of the conference.

Bayard L. England, Chairman of Atlantic City Electric Co., welcomed the group to Atlantic City for the conference which was part of the electric industry's program to encourage young people at high school level to become interested in science education and careers as scientists.

Robert E. Ginna, Chairman of the Board, Rochester Gas and Electric Corp., predicted that by 1980 a considerable portion of the kilowatts required to meet America's increasing electrical need will be produced from the atom.

Mr. Ginna said that the tremendous increase in de-

Representatives to the Youth Conference on the Atom examine one of the demonstration displays in the "You and the Atom" exhibit of the Atomic Energy Commission. Mechanical hands handle radioactive material by remote control.

mand for electricity in the next several years will place a heavy demand on all types of fuels.

"The human thirst for adventure, self-preservation and a better way of life motivates an ever-expanding search for new and more efficient sources and applications of energy in the form of mechanical power," he said. "To satisfy this thirst on a continuing basis, another form of energy is required—young minds with the drive of youth, schooled in the more complex means of energy derivation and utilization."

Atomic Fuel Necessary

Seen from a world-wide basis, Mr. Ginna said that the energy supply outlook was alarming, and that atomic fuel would have to fill the void. In his report on what the electric industry is doing to find the most economical means to produce electricity from the atom, he said "an exciting story has unfolded."

He said that now there are over 30 atomic generating projects under way by government, industry and other groups to find the best means of producing power at a reasonable price. Production of electricity by nuclear fuel has called for the solution of dozens of problems, and this represents a challenge to the young science students today, he told the group.

"We live in the age of miracles," he said. "But our horizons have broadened due to the fantastic advances that have been made in science, engineering, physics and similar fields. More than ever today we realize that the ability of the mind is virtually unlimited."

Declaring that "it is the nature of science to flourish most and to work best where individual men have freedom to think, explore and dispute," Dr. James Creese, President of Drexel Institute, warned that American schools must rid themselves of old-time practices and promote education if they are to lead the free world successfully against Russia.

Dr. Creese, who talked to educators and students in a recent trip through the Soviet Union, emphasized that the major question today is "whether the new disciplines of science and the older disciplines of freedom supplement one another," or if "by unhappy chance, science is a hireling soldier only."

The educator pointed out that in Russia all recruitment of scientists and technologists is taken care of by the Ministry of Education which sets the curriculum, assigns student quotas, hires the professors, controls examinations and makes up the lists of jobs and persons to fill them.

Misconception of Science's Role

The Russians can blame their Minister of Education if they have a lack of scientists, but Dr. Creese stated that "if we lack a full complement of young people for the vocations of science, it must be because of a popular misconception of the role of science in modern education."

In his trip through the Soviet Union, the educator noted one advantage that the Soviets have over the free countries in the fact that their education system has been built from the start since 1920. As a result, he said, "no long-established university tradition has tended there to delay acceptance at all school levels of the academic disciplines of modern science and technology."

He pointed out that Russian lower schools are designed to be strong just where American schools have been criticized for being deficient, especially in science and mathematics. The entrances to the Soviet colleges of science and technology are crowded. Mr. Creese said that 41 percent of the prescribed courses in the secondary schools are mathematical and scientific.

The educator saw two reasons for the rise of the Soviet education—the people's tremendous desire for it and the government's realization of the important place science and engineering have in its quest for world power.

However, Dr. Creese predicted a change for the better because of Russia's rise in science with new men coming to power "under new disciplines of science which invite a man to be discontented with error, half-truth and arbitrary dogma. Science has sometimes been said to be strictly neutral. I think it is not. A tyranny may use it; but for how long?" he asked.

A giant increase in population which in 100 years may put the world's population at 8 billion people will present greater opportunities and responsibilities for atomic scientists, Dr. Frank E. Myers, Associate Director of the Argonne National Laboratory, told the conference.

Needs of Expanded Population

"Our expanded population of the future," Dr. Myers declared, "cannot be supported by an illiterate, subsistence-level, agrarian economy, but only by literate, urban, industrial civilization—a civilization that will need more electricity."

He said the increased power needs would drain our already depleted fuel sources and place the responsibility on atomic scientists to supply the fuel need with nuclear power.

Dr. Myers said work was still to be done to bring nuclear electricity down to competitive price levels. He also pointed out that the problem of finding productive uses for the intensely radioactive waste material resulting from increased atomic power activity would present a challenge to scientists.

Looking into the future, Dr. Myers spoke of the unlimited energy resources expected by scientists from fusion of the deuterium in sea water, a gallon of which would release more energy than is available in a gallon of high-octane gas. He pointed out that in this practical phase of atomic activity, "certain problems are already clear, some are being solved, and some of the most exciting are still in the realm of unknown."

In the province of theoretical atomic activity, he told the group that scientists' problems of the future lay in producing, identifying and studying new particles and anti-particles, and that great opportunities present themselves through the giant accelerators now being built to produce the strange new particles.

Dr. Myers also said future scientists would find that "in the field of biology, radioactive isotopes have opened exciting possibilities for studying the baffling problems posed by growing plants."

Charles E. Robbins, Executive Manager of the Atomic Industrial Forum, Inc., told the conference that at this time "we can visualize only dimly the industrial applica-

tions of the atom." He added that "in your generation . . . great strides will be made to converting this remarkable energy to useful purposes."

Discussing atomic energy in the production of heat, Mr. Robbins pointed out that because of the meager supply of fuel in Europe and other parts of the world there was a great demand for heat-producing atomic reactors of which the United States, most economical producer of the machines, was the leading exporter.

In nuclear ship propulsion—both through water and air—America has also taken the lead, he said. Mr. Robbins noted the records set by the atomic submarines *Nautilus* and *Sea Wolf* and the 15 reactors being constructed for nuclear destroyers.

In aircraft, Mr. Robbins said that although flight by a military type nuclear-powered plane was three years off, a turbo-jet engine of aircraft type was operated on nuclear energy in 1957 in a ground test in Idaho.

He also commented on the application of heat for industrial processing and space heating and the experiments by chemical, metallurgical and other companies in heat from nuclear reactors as other fields for aspiring scientists.

The radioisotope is another important industrial area for the scientist, he said. He listed the use of radioisotopes in bringing better quality in manufacturing, in reducing the time of manufacturing processes and in making new materials by arranging chemical reactions.

Mr. Robbins noted that of the more than 2,000 industrial organizations licensed by the Atomic Energy Commission to use the isotope there were organizations in research, development and testing; electrical equipment, electronics and instrumentation; metalworking; paper and plastics, and chemical firms. He said each of these industries had an increase of between 13 and 21 per cent in the number of users last year.

Atomic energy is certain to play a major role in the solution of agricultural problems and eventually will change the pattern of agricultural practices in all countries of the world, Dr. Cyril L. Comar, Director of the Laboratory of Radiation Biology at Cornell University, told the conference.

Citing as a parallel the fact that the microscope saved the cattle industry from anthrax, Dr. Comar said that atomic energy and radioisotopes probably will be used by the agricultural scientist rather than the farmer directly.

The important strides made in medical science through broader use of isotopes was described by Dr. John S. Laughlin of the Sloan-Kettering Institute for Cancer Research. The scientist, Chief of the Institutes's Department of Physics and Biophysics, said a "multitude of research studies" have been made possible by radioactive isotopes.

Dr. Laughlin said that the application of isotopes to determine the volume of blood and other components of the human body is of "very great importance."

Dr. Ben D. Wood, Director of the Bureau of Collegiate Educational Research, Columbia University, and Chairman of the National Schools Committee of the American Economic Foundation, was consultant to the conference which was endorsed by the AEC.

The AEC exposition which occupied 5000 square feet of space and was on display to the public, contained 62 panels, along with models and other objects concerning the AEC peacetime program. Included in the display were explanations of the atom and atomic energy and information concerning raw materials, reactors, power, radioisotopes and their use in agriculture, medicine, industry and research. It also covered health and safety factors, training of scientists and technicians, and the AEC's program of international cooperation in atomic energy. The exhibit was sponsored at the conference by the American Institute of Electrical Engineers.

Harold F. Sanders

HAROLD F. SANDERS, 53, Vice President and Secretary and a Director of Middle South Utilities, Inc., died recently at his home in Malverne, N. Y., the victim of a heart attack.

Mr. Sanders was a member of the Community Presbyterian Church in Malverne. Active in local civic affairs, he was a Mason and a member of the Board of Education of Union Free School District #12, Town of Hempstead.

Mr. Sanders' entire career was spent in the utility business, beginning in 1921 when he was employed by Electric Bond and Share Co. In 1935 he joined Ebasco Services, Inc. and was with that company until joining Electric Power & Light Corp. in 1937. In 1938 he was elected assistant secretary and assistant treasurer, later becoming secretary and treasurer.

Upon the organization of Middle South Utilities, Inc. in 1949 he was elected secretary and treasurer. In June, 1958, he was elected vice president and to the board of directors.

Mr. Sanders was a member of the Controllers Institute of America, American Management Association, and American Society of Corporate Secretaries. In addition, he was a member of the Financing and Investor Relations Committee of the Edison Electric Institute.

50th Anniversary

OTTER TAIL POWER CO., an independent electric utility serving nearly 500 communities and surrounding rural areas in a 70,000-square-mile portion of Minnesota, North Dakota and South Dakota, observed the 50th anniversary of the company's first service to a customer in April of this year.

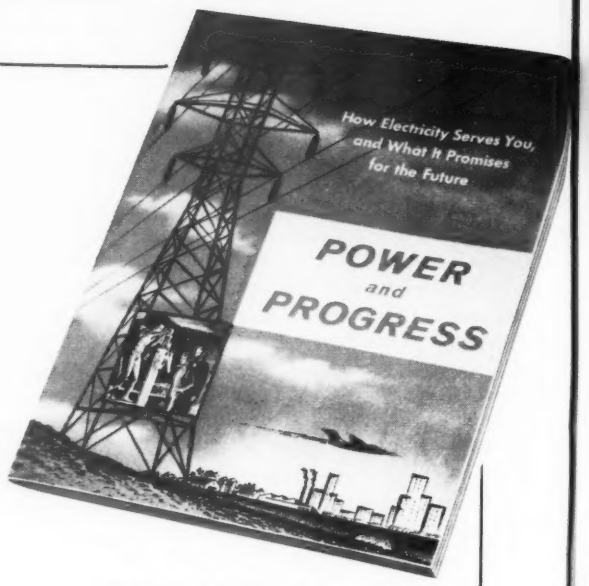
It was in early April, 1909, that electricity was first generated at the company's Dayton Hollow plant, a small hydro-electric station on the Otter Tail River near Fergus Falls, Minn., and sent over a 25-mile transmission line to the Northern Light Electric Co. of Wahpeton, N. D., Otter Tail's first customer.

'Power and Progress' Second Printing Now Available

Because of the demand for the industry booklet, "Power and Progress," it is now in its second printing. More than 100 companies have purchased copies for a wide range of readership.

Interest in large quantities of the booklet has been such that a new step has been added to the price schedule. On orders of more than 10,000 copies, the price is 15 cents each.

Companies have distributed the booklet to stockholders, to employees, to professional people, civic groups and organizations. It has been used as an information piece in connection with plant tours, open houses, and other company activities.



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Area Development Film Wins 'Chris' Award

S. F. McGowan, left, Chairman of the EEI Area Development Committee, accepts the "Chris" award for the Institute's Area Development film, "Plan for Prosperity," from D. F. Prugh, President of The Film Council of Greater Columbus. Looking on are D. D. Doyle, Bay State Film Productions, Inc., which produced the film, and J. M. Frank, right, Director of Area Development of Columbus and Southern Ohio Electric Co. Prints of the film are still available.

"PLAN for Prosperity," the 16 mm, sound-color film produced under the supervision of the Area Development Committee last Fall received a "Chris" award at the Seventh Annual Film Festival sponsored by the Film Council of Greater Columbus, Ohio, on April 30.

Designed to help awaken communities to the need for long-range planning, this 27-minute film is excellent for use on TV, as well as with chambers of commerce, civic organizations, high school and college classes, and other groups interested in improving their communities. It does not tell how to plan, but does show *why* communities should plan.

Copies are available, for a limited time only, to EEI member companies for a 10-day preview on a first-come, first-serve basis. Companies who have not as yet taken advantage of this offer are urged to do so immediately. It is well worth the effort.

The cost to EEI member companies is $200 per copy. A three-line credit trailer or leader can also be obtained for an additional $25 and covers any number of copies that may be ordered.

For further information, write to K. G. Adgate, Secretary, Area Development Committee, Edison Electric Institute, 750 Third Ave., New York 17, N. Y.

Electrical System and Equipment Committee Meeting

- *Survey of Generator Insulation*
- *New Type of High-Voltage Detector*
- *Welded Aluminum Substation Structures*

D. W. TAYLOR
Chairman

THE Electrical System and Equipment Committee held its 77th meeting at the Atlanta Biltmore Hotel in Atlanta, Ga., Feb. 16-17, with approximately 120 members and guests attending.

Papers, Reports, Discussions

The program consisted of papers, reports and discussions under the sponsorship of R. G. Meyerand, Vice Chairman of the committee; F. J. Berger, Chairman of the Subcommittee on System and Equipment Troubles; K. L. Wheeler, Chairman of the Subcommittee on Equipment and Station Design; V. J. Hayes, Chairman of the Subcommittee on System Engineering and Operation; R. M. Pennypacker, Chairman of the Subcommittee on Equipment and Station Operation and Maintenance; and A. P. Fugill, Chairman of the System Planning Subcommittee.

On Monday morning a closed session program of the Subcommittee on System and Equipment Troubles was presented. Various system disturbances and apparatus failures were informally discussed by the committee and guests.

A round table discussion of subjects of general interest which had been submitted previously by members was held in closed session on Monday afternoon. R. G. Meyerand was the moderator of this discussion period.

During the closed session on Monday, R. G. Pennypacker presented a report on efforts being made by the manufacturers to improve quality control in the manufacture of relays used for system and apparatus protection.

On Tuesday morning, under jurisdiction of the Subcommittee on Equipment and Station Operation and Maintenance, T. D. Reimers sponsored a paper, "A Survey of Generator Insulation Tests," which was presented by C. L. Sidway of the Southern California Edison Co.

Mr. Sidway surveyed the history of insulation testing of rotating electrical machinery, outlined the use of a-c and d-c tests, traced the development of high voltage d-c testing, and discussed the present status of non-destructive tests for the evaluation of rotating machine windings. The search for a practical, reliable test procedure which would assume freedom from in-service failures of rotating machine windings began over 30 years ago. It is now believed that a combination of visual and physical inspection and several electrical tests are needed to successfully determine the suitability of windings for service.

Maintenance Test on Winding

Mr. Sidway said that the real goal of any maintenance test on winding is to find its breakdown strength. If it can be shown that the winding breakdown strength is sufficiently greater than the operating voltage the machine can be operated with confidence. The only direct method of finding the breakdown strength is to apply a voltage that will cause failure; since this is impractical for machines in service, non-destructive indirect methods are used. These indirect methods measure some quality of the insulation which is believed to correlate with dielectric strength. Measurement may be made with a-c or d-c potentials. The usual a-c tests measure: voltage withstand, dielectric loss, capacitance, dissipation factor, power factor, corona starting level and ionization current.

Except for voltage withstand, no functional relation has been found between these insulation properties and breakdown strength. The usual d-c tests measure: voltage withstand, insulation resistance, dielectric absorption and insulation conduction current.

Here again, except for the voltage withstand test, no functional relation has been found between the property measured and breakdown strength. However, it is generally accepted that a knowledge of these properties, when correctly interpreted, does afford a sound basis for determining the suitability of a winding for service.

In conclusion, Mr. Sidway made these observations. Insulation resistance measurements at low or medium voltage have no direct relation to dielectric strength, but when periodically made and consideration given to Polarization Index, they are valuable to determine if a winding is in a satisfactory condition for applying high voltage tests.

Periodic insulation readings show the trend of the general condition of a winding as regards accumulation of conduction contaminants, or moisture absorption. They will not show the absolute dielectric strength.

Power factors tests are still of little value in locating winding insulation faults or incipient faults but if made periodically they may show a trend in the formation of internal voids or general deterioration of the insulation bond. They will not show the absolute dielectric strength.

Sixty-cycle ionization tests in the form of slot discharge measurements or corona-probe tests do give indication of certain winding conditions and are useful in locating discrete areas where there are appreciable cystoidal voids or loss of insulation bond.

Breakdown Strength

There is a different ratio of d-c to a-c breakdown strength for every kind and condition of insulation. The value of this ratio will vary from less than 1.4 for insulation that is fractured and dirty to 3.0 for new, solid, homogenious insulation. However, practical experience has shown that a winding that will withstand a d-c test 1.8 times a selected a-c value will always subsequently withstand a one-minute application of the selected a-c value. Hence, the high voltage d-c withstand

test may be used as a reliable substitute for an a-c withstand test.

Overvoltage tests are the only means of positively showing that winding has a certain level of insulation strength. At present, there is no reliable electrical test for determining the dielectric strength of turn-to-turn insulation. Surge tests can find actual shorted turns but cannot find impending shorted turns.

The second paper on the program was presented by W. Morrissey and described a new type of portable high-voltage detector developed by Consolidated Edison Co. of New York, Inc. The purpose of the "test stick" is to provide a means of detecting the possible presence of potential prior to the application of protective grounds, switching operations, removal or replacement of high voltage fuses, or working on or in the vicinity of exposed current-carrying equipment.

The "test stick" described by Mr. Morrissey is suitable for a voltage range of 600 to 50,000 volts a-c and d-c and has been successfully used by Consolidated Edison for three years. It utilizes a cold cathode thyratron tube which is always ready for instantaneous use but consumes no current while not in use. It carries its own power supply in the form of a small battery, making it a truly portable device and is both self-testing and "fail-safe." It provides both a glow light from the thyratron tube and a full-scale meter indication for all a-c and d-c voltages within its voltage range. Barring breakage, its life is extremely long.

The program of the Subcommittee on System Engineering and Operation consisted of a paper by W. C. Feaster of the Potomac Edison Co. entitled "Operating Experience with Transistor Type Carrier Equipment." Two 132-kv transmission lines of the Potomac Edison system are protected by carrier current relay sets using transistors. It is felt both economies have been effected and improved operation resulted from the installation of this equipment.

A. P. Fugill, Chairman of the System Planning Subcommittee, presented a progress report on the activities of his group. Projects which are presently under study by the subcommittee include Economic Comparison of Alternative Plans, Land Utilization, Outage and Interruption Recording, Load Forecasting, and Computer Program Task Force activities. The purpose of the Computer Program Task Force, operating under the Chairmanship of T. J. Nagel of the American Electric Power Service Corp., is to stimulate and coordinate the use of digital computers for the solution of engineering problems in the electric utility industry. Among the important objectives is the elimination of duplication in programming.

The program of the Subcommittee on Equipment and Station Design consisted of the presentation of a report on recent activities of ASA S-1, Acoustics, and ASA S-3, Bio-Acoustics, prepared by C. S. Murray of Consolidated Edison Co. New York, Inc.; a report by R. R. Wagstaff on the activities of the AEIC-EEI-NEMA Joint Committee on Power Circuit Breakers; and two papers on aluminum bus structures.

M. Steiner, Jr. of the Louisiana Power & Light Co. presented a paper on "Application and Design of Welded Aluminum Bus." He said the general type of ground-supported tubular bus used on its high voltage system has remained unchanged, but the use of steel and copper bus members has given away to aluminum. The use of aluminum as a bus conductor, together with the welding process, has resulted in direct economies in the actual construction of busses; additional benefits have resulted in the fields of engineering, stores handling, accounting, maintenance and operations. Mr. Steiner pointed out that operating experience with welded construction has been excellent. Since 1955 several thousand welded connections have been made on the LP&L properties with no failures reported.

The last paper on the program was presented by G. W. Swanson of the Consumers Power Co. and described use of welded aluminum substation structures. Use of aluminum as a substitute for steel had to be justified on a competitive economic basis since corrosion problems were of minor significance. In late 1957 a substation at an oil refinery was evaluated using first steel and then aluminum; the cost of the lighter metal was lower so the substation was erected in 1958. Tests of this substation were made in the field to investigate the distribution of stress in critical parts of the structure and to determine maximum column deflection under maximum design fiber stress. The difficulty of completely evaluating this type of design by analytical methods prompted the tests. They substantiated in most part the structural engineer's design theories of stress distribution.

How a Digital Computer Can Aid the T&D Engineer

(Continued from page 220)

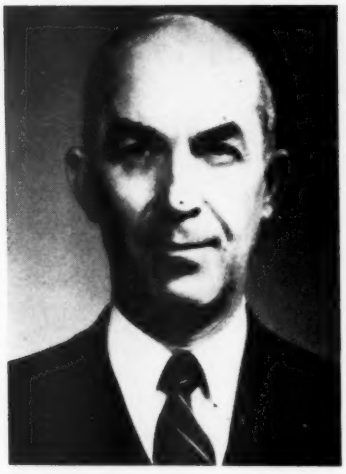
symbolic machine language is advantageous and necessary. This is true more frequently when medium-sized computers are used than for large computers. In such cases, where it is necessary to write programs in machine language and it is not desirable for the engineer to obtain this type of programming training, it should be remembered that other sources of trained programmers are generally readily available.

If a company has a computer for commercial purposes, there will be people in the company who have programming experience. These people more than likely would be available to program problems that the engineer has formulated. If such is not the case, experienced programming help is available from the many computer service bureaus located throughout the country. In general, however, less than one month in programming courses would familiarize an engineer with a particular computer to such an extent that he would be able to write acceptable programs in machine language when this is necessary.

In our company, we consider it desirable and profitable to maintain a section of seven engineering people who are thoroughly trained in digital computer programming for the purpose of applying scientific, engineering, and mathematical problems to electronic digital computers.

People in Power

CHARLES M. HAGAN



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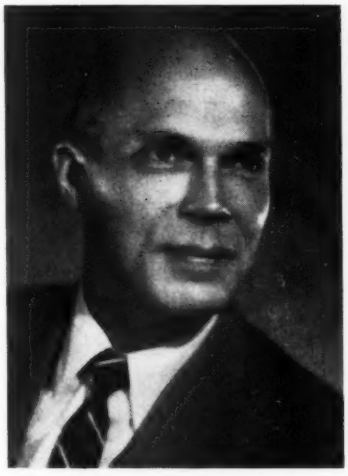

A. PAUL THOMPSON

N. BERNARD GUSSETT

BAYARD L. ENGLAND, President, Atlantic City Electric Co., has been elected Chairman of the Board and principal executive officer. CHARLES M. HAGAN, Executive Vice President, was elected President of the company to succeed Mr. England, who has headed the utility since 1949.

Mr. England, who started with the company in 1922 as a clerk, was born in Newark, N. J., but came to Atlantic City as a youth. He is a past president of Edison Electric Institute, New Jersey Utilities Association and New Jersey State Chamber of Commerce. He attended Temple University and received honorary doctorate degrees from Bucknell and Seton Hall Universities.

Mr. Hagan was born in Due West, S. C., and was graduated from Clemson A & M College in 1924. He also attended the Harvard Graduate School of Business. After four years with General Electric Co., Mr. Hagan joined Atlantic City Electric in 1928 as a power engineer. After holding several positions in the company, he was elected executive vice president in 1952.

He is active in civic and industry organizations and is a past president of the New Jersey Utilities Association. He has been associated with the Atlantic Area Council, Boy Scouts of America and Atlantic City and Salem Rotary Clubs.

A. PAUL THOMPSON, Executive Vice President, Iowa Power and Light Co., recently was named President of the company, and N. BERNARD GUSSETT, President, was made Chairman of the Board, a new post. L. E. SLADE, Secretary, was named Financial Vice President, Secretary and Treasurer.

In January of this year Mr. Thompson was elected executive vice president. Prior to that time he had been vice president and treasurer. Mr. Thompson, who is a former Coordinator of the EEI Accounting Division's General Activities Group, joined the company in 1950. Before that he had been with the Central National Bank of Cleveland. Between 1931 and 1950 he held various posts at the bank including investment analyst, auditor, and assistant vice president.

Mr. Gussett began his career as a cadet engineer for Stone and Webster Engineering Corp. and Electric Bond and Share Co. properties. In 1925 he joined the San Antonio Public Service Co. as assistant engineer. Moving up through the organization, he became its chief executive in 1949. Later that year he resigned to accept the presidency of Iowa Power and Light. He has served two terms as a director of EEI.

Mr. Slade joined the company in 1940 as an engineer and was elected secretary in 1948. He was made financial vice president in January of this year.

H. H. PLANK, President and General Manager of Delaware Power & Light Co., has been elected Chairman of the Board, and FRANK P. HYER, Vice President in Charge of Engineering, Operations and Construction, was elected President & General Manager. It was also announced that HAROLD W. CLIFT was elected Vice President in Charge of Gas and Electric Operations. R. B. RICHARDSON, Vice President, will assume most of the other responsibilities formerly under the direction of Mr. Hyer.

The following appointments also were made: J. W. MACKIE, Comptroller; H. J. Perkner, Assistant Comp-

FRANK P. HYER

H. H. PLANK

EARL J. DREWELOW

troller, and H. MARVIN BARRETT, Purchasing Agent.

Mr. Plank, President of the company since 1956, is a graduate of the Clarkson College of Technology. He joined Wilmington Power & Light in 1943 as assistant to the general manager. Before joining the Delaware electric company, he was for many years with the United Gas Improvement Co. in Philadelphia.

Mr. Hyer joined the company in 1947 as supervisor of operations. Upon graduation from the University of Wisconsin, he entered the public utility business. Prior to his association with Delaware Power & Light, he was employed as operations and engineering consultant by the General Public Utilities Corp. of New York, and served on the boards of directors of several of its principal subsidiary companies.

Mr. Hyer is president of the Delaware Society of Professional Engineers and chief of the Utility Division of the Delaware State Department of Civil Defense.

Mr. Clift was graduated from Wilmington High School and the University of Delaware with a degree in electrical engineering and studied utility engineering at Columbia University. He joined the Wilmington Gas Co. in 1924 as a cadet engineer. In 1957 Mr. Clift was appointed operating manager, with supervision of the gas and electric operations of the company.

Four promotions to top managerial positions in the Empire District Electric Co. were recently announced. EARL J. DREWELOW, Vice President and General Manager, becomes President, succeeding D. C. MCKEE, who was re-elected Chairman of the Board. J. T. JONES, Assistant General Manager, was elected Vice President and General Manager. FRANK H. SHELTON, Vice President and Treasurer, was re-elected Vice President, and the duties of Treasurer were given to MARK E. WHITAKER, who has been Secretary and Controller. As Treasurer, Mr. Whitaker will continue in charge of the accounting department. JAMES P. DODGE was elected Secretary, succeeding Mr. Whitaker.

Mr. Drewelow is a graduate engineer of Iowa State College. He has had 35 years experience in electric utility operations. He came to Empire from Denver in 1927 as power plant efficiency engineer at Riverton. He became chief engineer in 1929 and superintendent in 1945. In 1949, he was named assistant general superintendent of operations, and in 1951, was elected vice president in charge of operations. He was appointed assistant general manager in 1954, and became general manager in 1955.

Mr. Jones is a graduate electrical engineer from Rose Polytechnic Institute. Employed by Empire for 24 years, he has moved up steadily, principally through the merchandise sales and service department, which he headed until 1956, when he was appointed assistant general manager.

Mr. Whitaker attended the University of Missouri. He joined Empire in 1940 in the accounting department. In 1944 he was made supervisor of plant accounting, and in 1945 he was elected secretary and controller.

Mr. Dodge holds a degree in accounting and business administration from Kansas State College. He entered the rate department in 1951, and for several years has been supervisor of rates.

EDWARD R. COULBOURN, Engineering Manager, and DOUGLAS F. ELLIOTT, Construction Manager, Alabama Power Co., were elected Vice Presidents of the company. Mr. Coulbourn is Vice President in Charge of Engineering and Mr. Elliott is Vice President in Charge of Construction. They succeed F. C. WEISS, retired.

Mr. Coulbourn, who received his degree in mechanical engineering from the University of Alabama, joined the company in 1924 as office engineer-distribution. From 1925 to 1931 he worked in the same capacity for the old Dixie Construction Co., returning to Alabama Power as senior engineer-transmission and distribution. He became manager of engineering in 1951. Mr. Elliott is a graduate of Massachusetts Institute of Technology. He came to the company via the Dixie Construction Co. in 1924 as an apprentice engineer. He was made construction manager in 1944. Mr. Weiss retired after 45 years of service with Alabama Power Co. He has been closely identified with the planning, design, and construction of the company's generating plants and transmission system.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

OFFICERS

J. E. CORETTE, *President*.....The Montana Power Co., Butte, Mont.
ALLEN S. KING, *Vice President*.....Northern States Power Co., Minneapolis, Minn.
EDWIN VENNARD, *Vice President and Managing Director*.....750 Third Ave., New York, N. Y.
H. S. SUTTON, *Treasurer*.....Consolidated Edison Co. of New York, Inc., New York, N. Y.
A. B. MORGAN, *Secretary and Assistant Managing Director*.....750 Third Ave., New York, N. Y.

BOARD OF DIRECTORS

(Terms expiring 1960)

W. C. BECKJORD, The Cincinnati Gas & Electric Co.
W. C. BELL, The United Illuminating Co.
J. F. DAVENPORT, Southern California Edison Co.
T. W. DELZELL, Portland General Electric Co.
G. S. DINWIDDIE, New Orleans Public Service Inc.
WILLIS GALE, Commonwealth Edison Co.
M. L. KAPP, Interstate Power Co.
W. T. LUCKING, Arizona Public Service Co.
W. W. LYNCH, Texas Power & Light Co.
L. C. MCCLURKIN, Savannah Electric and Power Co.
J. J. MCDONOUGH, Georgia Power Co.
W. B. MCGUIRE, JR., Duke Power Co.
A. R. SCHILLER, Public Service Co. of New Hampshire
G. W. VAN DERZEE, Wisconsin Electric Power Co.
J. THEODORE WOLFE, Baltimore Gas and Electric Co.

(Terms expiring 1961)

J. K. BUSBY, Pennsylvania Power & Light Co.
D. C. COOK, American Electric Power Co., Inc.
E. W. DOEBLER, Long Island Lighting Co.
R. R. DUNN, Potomac Electric Power Co.
C. E. EBLE, Consolidated Edison Co. of New York, Inc.
F. I. FAIRMAN, Kentucky Utilities Co.
P. A. FLEGER, Duquesne Light Co.
D. E. KARN, Consumers Power Co.
D. S. KENNEDY, Oklahoma Gas and Electric Co.
E. D. SHERWIN, San Diego Gas & Electric Co.
N. R. SUTHERLAND, Pacific Gas and Electric Co.
L. V. SUTTON, Carolina Power & Light Co.
W. F. TAIT, JR., Public Service Electric and Gas Co.
WILLIAM WEBSTER, New England Electric System
C. H. WHITMORE, Iowa-Illinois Gas and Electric Co.

(Terms expiring 1962)

E. R. ACKER, Central Hudson Gas & Electric Corp.
W. L. CISLER, The Detroit Edison Co.
J. E. CORETTE, The Montana Power Co.
G. W. EVANS, Kansas Gas and Electric Co.
O. T. FITZWATER, Indianapolis Power & Light Co.
R. A. GIBSON, The Hartford Electric Light Co.
R. E. GINNA, Rochester Gas and Electric Corp.
E. L. LINDSETH, The Cleveland Electric Illuminating Co.
J. W. MCAFEE, Union Electric Co.
H. M. MILLER, Columbus and Southern Ohio Electric Co.
E. M. NAUGHTON, Utah Power & Light Co.
J. L. RICE, JR., The West Penn Electric Co.
H. P. TAYLOR, Wisconsin Public Service Corp.
O. TITUS, Metropolitan Edison Co.
D. J. TUEPKER, Public Service Co. of Oklahoma

ADVISORY COMMITTEE 1958-1959

E. R. ACKER, Central Hudson Gas & Electric Corp.
D. C. BARNES, Virginia Electric and Power Co.
A. D. BARNEY, The Hartford Electric Light Co.
J. B. BLACK, Pacific Gas and Electric Co.
HARLLEE BRANCH, JR., The Southern Co.
W. L. CISLER, The Detroit Edison Co.
C. P. CRANE, Baltimore Gas and Electric Co.
C. B. DELAFIELD, Consolidated Edison Co. of N. Y., Inc.
T. G. DIGNAN, Boston Edison Co.
EDGAR H. DIXON, Middle South Utilities, Inc.
GEORGE M. GADSBY, Utah Power & Light Co.
D. C. LUCE, Public Service Electric and Gas Co.
GEORGE L. MACGREGOR, Texas Utilities Co.
PAUL B. MCKEE, Pacific Power & Light Co.
I. L. MOORE, New England Electric System
GROVER C. NEFF, Wisconsin Power and Light Co.
C. E. OAKES, Pennsylvania Power & Light Co.
J. S. OSBORNE, Central & South West Corp.
HAROLD QUINTON, Southern California Edison Co.
K. M. ROBINSON, The Washington Water Power Co.
MCGREGOR SMITH, Florida Power & Light Co.
PHILIP SPORN, American Electric Power Co., Inc.
FRANK M. TAIT, The Dayton Power and Light Co.
J. B. THOMAS, Texas Electric Service Co.
E. S. THOMPSON, The West Penn Electric Co.
ALLEN VAN WYCK, Illinois Power Co.

CHAIRMEN OF EDISON ELECTRIC INSTITUTE COMMITTEES (1958-1959)

COMMITTEES OF THE BOARD OF DIRECTORS

Atomic Power, E. L. LINDSETH.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Management Practices Committee, S. L. DRUMM.....West Penn Power Co., Greensburg, Pa.
Membership, E. S. THOMPSON.....The West Penn Electric Co., New York, N. Y.
Regulation, C. E. KOHLHEPP.....Jersey Central Power & Light Co., Denville, N. J.
Relations with Educational Institutions, S. R. KNAPP.....The Connecticut Light & Power Co., Berlin, Conn.
Special Tax Policy, D. S. KENNEDY.....Oklahoma Gas and Electric Co., Oklahoma City, Okla.

CHAIRMEN OF EDISON ELECTRIC INSTITUTE COMMITTEES (1958-1959)

(Continued)

ACCOUNTING DIVISION

Accounting Division Executive, B. J. McMILLEN.....The Cincinnati Gas & Electric Co., Cincinnati, Ohio
Coordinator of Customer Activities Group, A. B. WILSON.....Georgia Power Co., Atlanta, Ga.
Accounting Division Customer Relations, R. D. DAVIS.....Ohio Power Co., Newark, Ohio
Customer Accounting, D. M. ARNOLD.....Pennsylvania Power Co., New Castle, Pa.
Customer Collections, F. U. NAYLOR.....Pacific Gas and Electric Co., San Francisco, Calif.
Coordinator of General Activities Group, A. R. ST. BERNARD.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Depreciation Accounting, L. W. ROBINSON.....Consumers Power Co., Jackson, Mich.
General Accounting, G. F. JONES.....Potomac Electric Power Co., Washington, D. C.
Internal Auditing, ANTON STEVEN.....West Penn Power Co., Greensburg, Pa.
Plant Accounting and Property Records, L. W. BURNS.....Northern States Power Co., Minneapolis, Minn.
Taxation Accounting, G. J. COVALT.....The West Penn Electric Co., New York, N. Y.
Coordinator of Special Activities Group, P. R. LAWSON.....Pennsylvania Electric Co., Johnstown, Pa.
Accounting Developments Service, J. P. WILLIAMSON.....The Toledo Edison Co., Toledo, Ohio
Accounting Employee Relations, J. J. LEARY.....Boston Edison Co., Boston, Mass.
Application of Accounting Principles, V. A. KOS.....Commonwealth Edison Co., Chicago, Ill.
Electronic Accounting Machine Developments, R. E. HARBAUGH.....Philadelphia Electric Co., Philadelphia, Pa.
Uniform System of Accounts, R. G. SCHNEIDER.....Virginia Electric and Power Co., Richmond, Va.

COMMERCIAL DIVISION

Commercial Division Executive, E. O. GEORGE.....The Detroit Edison Co., Detroit, Mich.
Commercial Sales Group, H. R. JONES.....West Penn Power Co., Greensburg, Pa.
Commercial Cooking & Water Heating, R. L. MCCUEN.....Duke Power Co., Charlotte, N. C.
Commercial Lighting, G. J. GILLEN.....Consolidated Edison Co. of New York, Inc., New York, N. Y.
Electric Space Heating & Air Conditioning, L. E. BLADES.....Arkansas Power & Light Co., Little Rock, Ark.
Street Lighting, G. G. WHEELER.....Northern States Power Co., Minneapolis, Minn.
Farm Group, P. R. SCHEPERS.....Consumers Power Co., Jackson, Mich.
Farm Development, M. H. LLOYD.....Niagara Mohawk Power Corp., Syracuse, N. Y.
Farm Promotion, H. M. GIBBS.....Texas Power & Light Co., Dallas, Texas
Industrial Power & Heating Group, P. W. MCCORMICK.....Union Electric Co., St. Louis, Mo.
Competitive Service, R. W. BASCHNAGEL.....Rochester Gas & Electric Corp., Rochester, N. Y.
General Power & Heating, J. H. AHRENS.....The Hartford Electric Light Co., Hartford, Conn.
Sales Methods & Development, A. D. SPILLMAN.....Philadelphia Electric Co., Philadelphia, Pa.
Residential Group, R. G. MACDONALD.....West Penn Power Co., Greensburg, Pa.
Home Service, JUDITH O'FLAHERTY.....Philadelphia Electric Co., Philadelphia, Pa.
Residential Appliance Promotion, E. J. HURLEY.....The Detroit Edison Co., Detroit, Mich.
Residential Lighting Promotion, R. J. MILLER.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Residential Wiring Promotion, J. R. FURBER.....Northern States Power Co., Minneapolis, Minn.
Advertising, J. V. MACDONALD.....Boston Edison Co., Boston, Mass.
Area Development, S. F. MCGOWAN.....Northern States Power Co., Minneapolis, Minn.
Electrical Living Policy Committee, G. W. OUSLER.....Duquesne Light Co., Pittsburgh, Pa.
Sales Personnel & Training, G. W. WARNER.....Consumers Power Co., Jackson, Mich.

CUSTOMER, EMPLOYEE AND INVESTOR RELATIONS DIVISION

Customer, Employee and Investor Relations Executive, C. E. OAKES.....Pennsylvania Power & Light Co., Allentown, Pa.
Customer Relations, KIMBALL JACK.....The Washington Water Power Co., Spokane, Wash.
Industrial Relations, E. J. BRILL.....Pennsylvania Power & Light Co., Allentown, Pa.
Investor Relations, L. E. REYNOLDS.....The Connecticut Light & Power Co., Hartford, Conn.

ENGINEERING DIVISION

Engineering & Operating Division Executive, W. L. CHADWICK.....Southern California Edison Co., Los Angeles, Calif.
Electrical System & Equipment, D. W. TAYLOR.....Public Service Electric and Gas Co., Newark, N. J.
Hydraulic Power, E. S. HARRISON.....Georgia Power Co., Atlanta, Ga.
Meter & Service, FLOYD SALMON.....Central Power and Light Co., Corpus Christi, Texas
Prime Movers, V. L. STONE.....Commonwealth Edison Co., Chicago, Ill.
Transmission & Distribution, W. M. PENNEY.....Union Electric Co., St. Louis, Mo.
Transportation, W. B. STREITLE.....Rochester Gas and Electric Corp., Rochester, N. Y.

GENERAL DIVISION

General Division Executive, P. A. FLEGER.....Duquesne Light Co., Pittsburgh, Pa.
Accident Prevention, I. R. DOHR.....Consumers Power Co., Jackson, Mich.
Awards, M. C. ALBRITTAIN.....Baltimore Gas and Electric Co., Baltimore, Md.
Electric Power Survey, ARTHUR S. GRISWOLD.....The Detroit Edison Co., Detroit, Mich.
Insurance, D. E. WILLIAMS.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Legal, H. L. BRANAN.....Oklahoma Gas and Electric Co., Oklahoma City, Okla.
Purchasing and Stores, G. H. COLE.....Alabama Power Co., Birmingham, Ala.
Rate Research, K. W. HASBROUCK.....New York State Electric & Gas Corp., Ithaca, N. Y.
Research Projects, E. L. HOUGH.....Union Electric Co., St. Louis, Mo.
Statistical, A. E. BUSH.....The Detroit Edison Co., Detroit, Mich.
Technical Exchange for Overseas Visitors, HARVEY BUMGARDNER.....The Detroit Edison Co., Detroit, Mich.